THE IRON AGE

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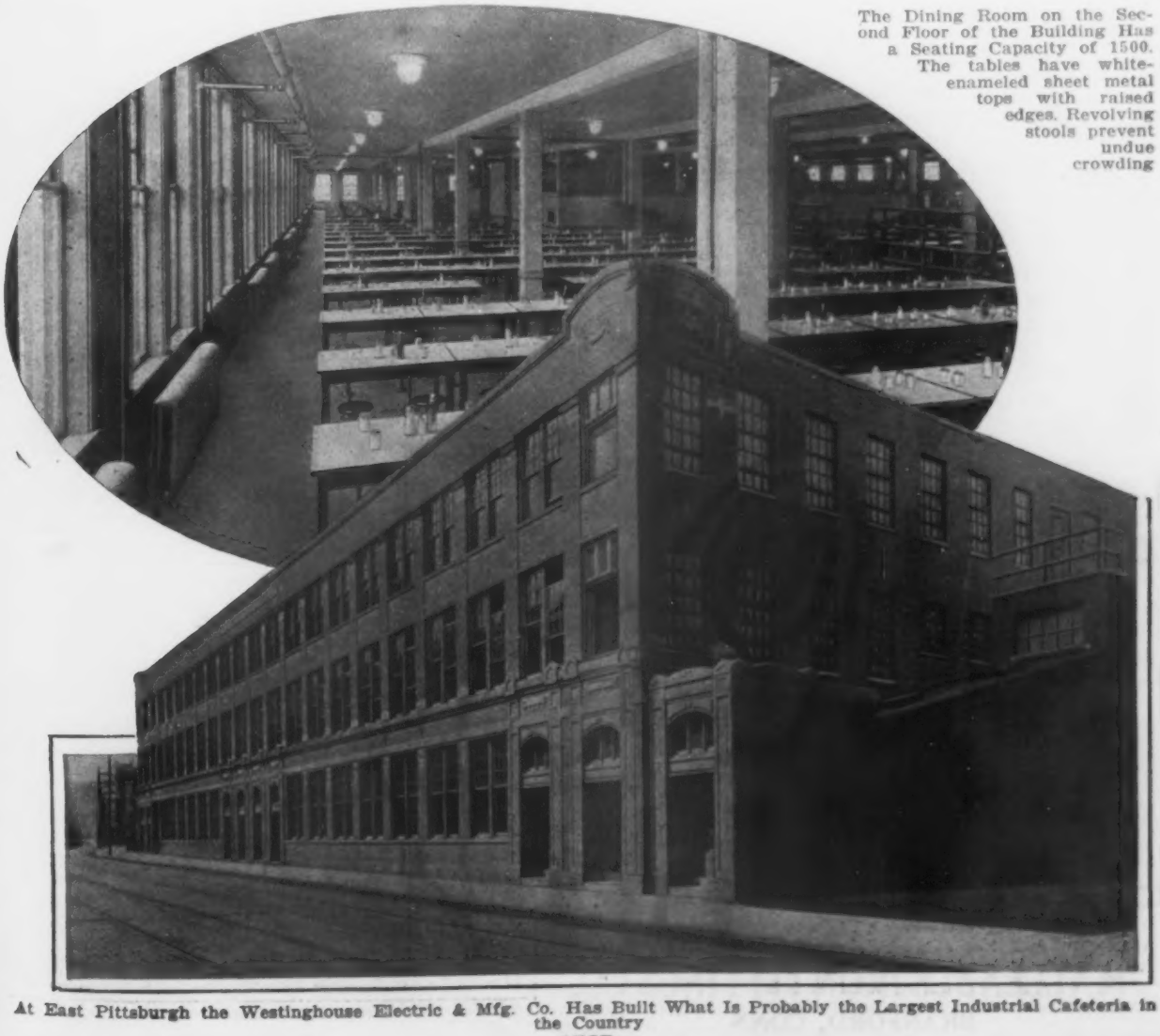
Solves Problem of Feeding Army of Workers

Large Westinghouse Cafeteria at East Pittsburgh Will Serve Nine Thousand People an Hour—Conveyor Belts and Other Labor-Saving Equipment

LIKE the army in the field, the army of the factory must be well fed to produce maximum results. When a concern employs close to 50,000 people, as is true of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., the question of providing wholesome food assumes proportions which command attention. Offhand one might regard it a stupendous task, hardly justified by business considerations, to provide lunch room facilities for any considerable part of so large a body of employees. The Westinghouse company, on the other hand, believed that the provision of better food for its employees would have an effect on the physical condition and the morale of the workers which would insure ample returns on the investment involved.

It was for practical reasons, then, that the Westinghouse company undertook the construction and equipment of what is probably the largest industrial cafeteria in the world. In design of the building and the selection of equipment as much care was exercised as is employed when preparing plans for a new factory unit. With so many people to serve it was essential that



The Dining Room on the Second Floor of the Building Has a Seating Capacity of 1500. The tables have white-enameled sheet metal tops with raised edges. Revolving stools prevent undue crowding

At East Pittsburgh the Westinghouse Electric & Mfg. Co. Has Built What Is Probably the Largest Industrial Cafeteria in the Country

close attention be paid to features which would insure the greatest possible service from the facilities provided. That this problem was solved with a marked degree of success is indicated by the fact that the restaurant constructed will feed approximately 9000 people an hour.

The Westinghouse cafeteria building is 100 x 300 ft., with three stories and a basement. It is of brick and concrete construction, fireproof, and attractive from an architectural standpoint. Located on Braddock Avenue, just across the street from the main group of buildings of the Westinghouse plant, it is convenient for a maximum number of employees. The entire first and second floors of the building are devoted to cafeteria purposes. On the first floor is an exclusive cafeteria for women and another for men. The second floor is occupied by one cafeteria for both men and women. On the third floor is a dining room for foremen and department heads of the company, the kitchen and an auditorium. In the basement is refrigerating machinery and a laundry.

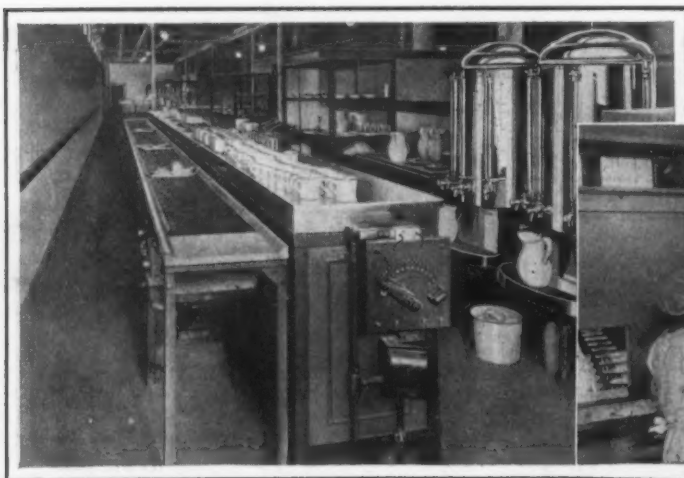
The building was planned and built so as to effect the closest harmony between the structure and the equipment. So well has this been done that 3000 people can enter the building, eat their lunches and be out again in 22 min. The employees going to the second floor enter at the center and proceed up an incline, or ramp, whence they go to the section of the cafeteria nearest to them. After eating, they depart at either end of the building down other ramps. Thus there is a continuous circulation of workpeople in and out all through the luncheon and supper hours. The ramps are built on a 14 per cent grade and are very easy to negotiate. They may be crowded to capacity, and yet, as the movement is all in one direction, there is no confusion. Similar ramps extend to and from the third floor, and separate entrances and exits are provided for the first floor cafeterias.

One of the principal causes of delay in a cafeteria is the indecision of a few in the line waiting to be served. To overcome this difficulty the Westinghouse company placed a continuous belt before each service counter. As the employee enters the line he picks out his tray and silverware, as he does in an ordinary cafeteria, but instead of carrying it or pushing it along on a rail, he places it on the moving belt. As the tray moves along the employee follows it, first taking his bread and butter, which is ready, laid out on a plate, and then selecting his meat and vegetables. Usually there are two kinds of meat, or one of fish and one of meat, with vegetables. These are laid out on plates in advance so as to avoid the delay of serving. The employees takes the plate he desires, puts it on the tray which is being carried along by the belt, and then passes to the dessert and beverage section. Here he makes his selection out of two or three desserts at his disposal and takes a cup of coffee or a glass of milk. By this time the end of the belt is reached, and the tray slips off on to the end of the service counter. The moving belt permits 34 persons a minute to pass each service counter. Although one might think that an arrangement of this sort would prove confusing, the employees, after a few trials, experienced little difficulty in connection with it. At first one of the cafeteria attendants stood at the end of the belt so as to shut off the motor in case there should be a jam. Despite the novelty of the belt there were few jams even the first day. The employees quickly found that if the tray passed along a trifle too fast they could hold it in place on the belt while they were getting what they wanted. At the same time the fact that the belt was moving impressed the people being served with the necessity of haste.

A plate meal of the kind just mentioned costs the employee an even 25 cents. If he desires dessert he pays 10 cents more. After passing a checker, equipped with a lightning coin changer, he sits down at a table, leaving all his dishes on the tray.

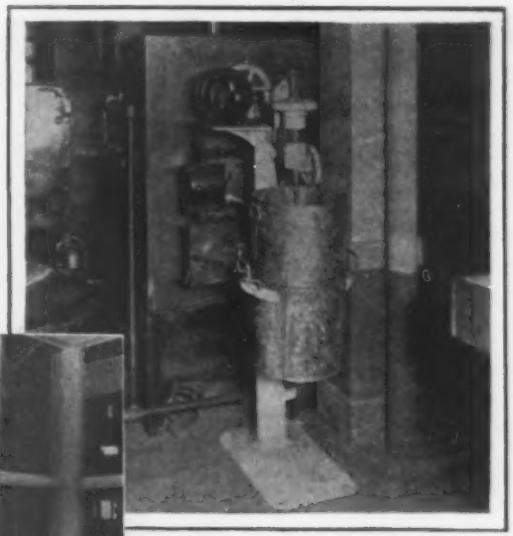
After eating the employee picks up his tray and carries it to another moving belt, by which the tray is taken to an automatic elevator, or subveyor, which conveys it to the dish-washing room. It was first thought impracticable to provide continuous belts for the soiled dishes, but the contrary has proved the case, most of the employees being only too willing to do this small service in the interest of the scheme of operation. The few trays which are left on the tables are easily disposed of by attendants.

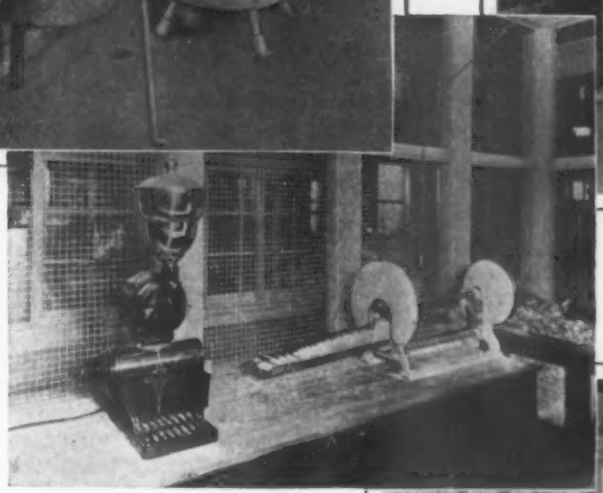
Two dish-washing rooms are located in the center of the second floor. Trays of soiled dishes from that floor are received directly from belts, while trays from the other lunch rooms are handled by subveyors connecting with belts on the first floor. From the belts on the first floor the trays are slipped into grooves of the proper size in the subveyors, it being unnecessary to stop the latter to perform the transfer. As the trays reach the second floor they are pulled off the subveyor by attendants and deposited on counters, whence they are passed through "Champion" continuous dish-washing machines. There are two of these, each having a capacity of 14,000 dishes an hour. The machine is an inclosed box-like apparatus, containing sprays of hot soapy water which are directed against the dishes



The Building Is Equipped with Eight Service Counters, Each of Which Has a Moving Belt for Carrying the Trays of the Patrons. An average of 34 persons a minute pass the service counter during meal periods

Trays of Soiled Dishes Are Received from Floor Below the Washing Room by Means of Subveyors





Above Is a Motor-Driven Slaw Cutter and a Potato Peeler. At the right a coffee mill and bread slicer, the latter cutting 150 slices per min.

The Potato Masher Shown Above Has a Capacity of 10 Gal. of Potatoes a Min.

Each of Two Rooms Has a Continuous Dishwashing Machine with a Capacity of 14,000 Dishes per Hr.

from almost every angle, melting all grease. The temperature of the water is so high that by the time the dishes pass out of the machine they are dry. They are then placed on metal tables, shelves and cabinets, of which there are an ample supply in each of the dish-washing rooms.

The kitchen is located on the third floor and was equipped with an eye to convenience and ease of operation. As the lunch periods are necessarily brief, the necessity for expeditious handling of food was apparent at the outset and hence particular attention was given to labor-saving devices. The kitchen has three sections of combination coal and gas ranges of the Lang type, which burn either soft coal or gas with equally good results. A desirable feature of the range is that when gas is used not all of the burners have to be utilized all the time. As soon as the tops and ovens are thoroughly heated the burners may be turned off, thus greatly reducing the amount of gas consumed. A Garland double gas broiler, for broiling steaks, fish and poultry, has also been provided. This has an adjustable gridiron. Another feature of the kitchen is a combination cook's table, steam table and warming closet. The steam table is in the center of this combination outfit, with doors on both sides arranged so that it is accessible to the cooks and waiters. On each end is a table for service. For cooking soup two 60-gal. iron-jacketed steam-heated stock kettles have been provided. The jackets are over the entire bottom of the kettles and two-thirds of the way up the sides. These are said to be superior to full-jacketed boilers, as they insure boiling from the bottom, which is the way soup stock should be boiled.

For cooking vegetables the kitchen is equipped with three large sectional steamers. Each of these has three compartments, permitting different kinds of vegetables to be cooked at the same time. In addition, a steam roasting kettle, has been provided which will roast 100 to 125 lb. of meat at a time.

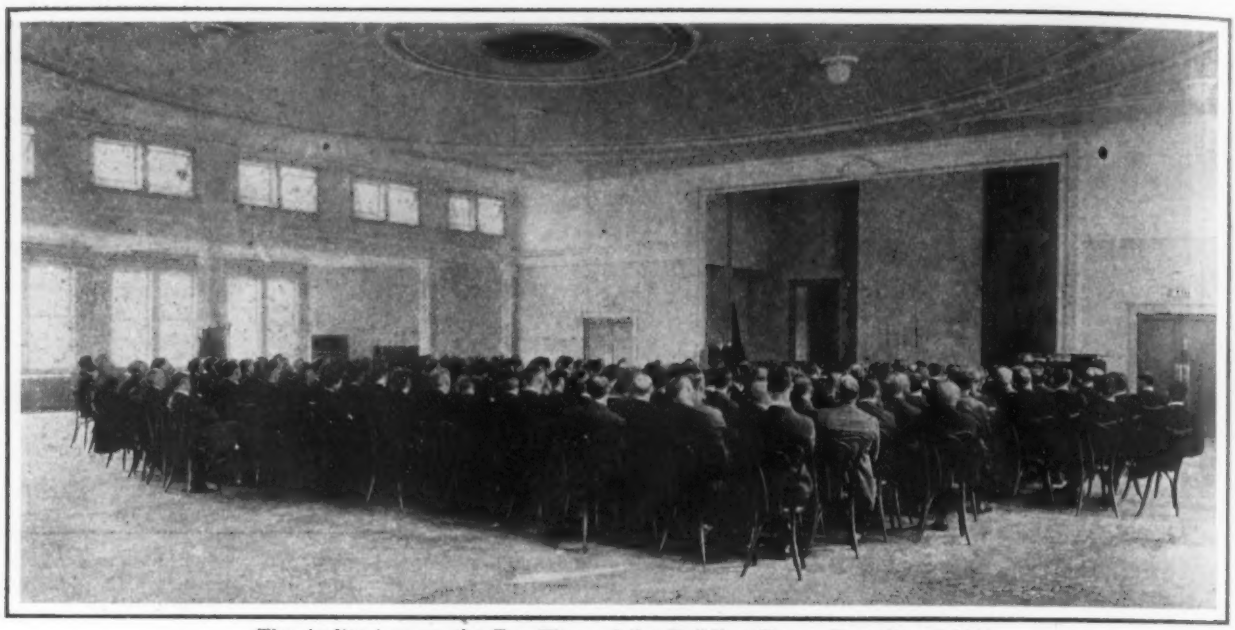
Motor equipment is used wherever possible in the kitchen. There are motor-driven potato-mashers, potato-parers, bread-slicers, coffee-grinders and meat-choppers. The potato-masher has a capacity of 10 gal. per min., and the bread slicer will cut 150 slices a minute.

The refrigerator space in the kitchen is exceptionally large, providing ample cold storage. The refrigerators are constructed of cork and cement, and are cooled by mechanical means. There is a freezing room, and separate compartments for meats, vegetables and produce. A bakery has been provided which is equipped with two large electric ovens in which are baked all the pies and pastry the cafeteria uses. There is also a Read motor-driven dough-mixing machine.

All of the supplies for the kitchen enter through a receiving room, which has two large scales for weighing meats and provisions, and is so arranged that all the food received is sent to places of storage or is used directly. After the meats are weighed on the receiving platform, they are carried by overhead monorail to a meat compartment in the cold storage room. Another overhead track conveys the meats to the butcher shop as they are needed. A feature of the butcher shop is a motor-driven meat chopper of the silent type.

From the kitchen the food is carried to the two lower floors by means of subveyors. The latter operate continuously like the endless chain on an old-fashioned pump and thus the service from the kitchen to the floors below is expeditious.

From the subveyors the food is conveyed to the steam tables and plate warmers behind the service counters. The various service counters in the cafeteria are built of polished black steel with nickel silver tops. Just beneath the top there is a heating space for keeping plates of food hot and at one end is a cool section for chipped butter. Besides steam tables and additional



The Auditorium on the Top Floor of the Building Has a Capacity of 1000

plate warmers back of the service counters there are stands for carrying reserve supplies of pastry, pies and bread, ice cream and milk cabinets, coffee urns, salad tables and a special refrigerator. There are 12 coffee urns in the cafeteria, each having a capacity of 30 gal.

The lunch rooms are supplied with tables having white-enameled sheet metal tops with raised edges. In the second floor cafeteria and in the men's section on the first floor there are revolving stools secured to the floor. In the women's portion of the first floor cafeteria, chairs are provided. The advantage of the stools is that they prevent undue crowding and tend to eliminate confusion. The seating capacity of the second floor cafeteria is 1500.

On the third floor is the dining room of the foremen and department heads of the company, called the East Pittsburgh Club. It is equipped with tables having Carrara glass tops and with chairs. The seating capacity is 500. Waiter service is furnished and the same scale of popular prices prevails as in the regular cafeteria floors, with the difference that there is a somewhat more extended variety of foods offered in the menus. There is a special service pantry and a small dish-washing room adjoining the East Pittsburgh Club.

The refrigerating plant of the cafeteria is located in the basement. It is equipped with a large Baker ice-making machine and a "Champion" brine ice-cream freezer. Here also is cooled all the water that is supplied to sanitary drinking fountains which are located throughout the building. There is also a laundry in the basement, with equipment for washing table linen, towels, and employees' coats and aprons. It also has a large steam dryer.

Two meals a day are served at the cafeteria building—luncheon and supper. The supper is mainly for those working overtime. Operation of the cafeteria at the supper hour is the same as during luncheon, with the exception of the checking and paying. The office help and other salaried employees who do not get paid for overtime are given supper checks. These they give to a cashier as they enter the serving lines. The employees who are paid overtime are required to pay for the meal. They pay the cashier before entering the line.

An important feature of the cafeteria building is the large assembly room on the third floor. This is equipped with a motor-driven moving picture machine, has a large stage, and can seat nearly a thousand people. It is used both for purposes of entertainment and instruction. Often a gathering is assembled immediately after the noon lunch hour. The room is also at the disposal of employees for various entertainments and diversions which they may arrange. On the Saturday evening following the opening of the cafeteria a boxing match was held in the auditorium.

In constructing so large a cafeteria with such complete labor-saving equipment the Westinghouse Electric & Mfg. Co. not only made a heavy investment, but took a step which had few, if any, precedents in the annals of industry. The experiment was undertaken on the theory that ample returns would accrue in the increased efficiency of the working force, and that the judgment of the company was sound has already been demonstrated. The equipment of the building throughout was furnished by Albert Pick & Co., Chicago. The structure was designes by B. H. Prack, industrial engineer, Pittsburgh.

The tolerances on cold rolled strip steel tabulated in THE IRON AGE of Nov. 18 are plus or minus tolerances, and not plus and minus. In other words, the tolerances give the fractional allowance both above and below the required or specified thickness.

A debate on "Increased production must come from improved management and not from augmented equipment" is to be conducted by the New York Chapter of the Society of Industrial Engineers on Monday evening, Dec. 13, in the Engineering Societies Building, New York. The affirmative side of the question is to be taken by William B. Ferguson and Nicholas T. Ficker, and the negative by L. P. Alford and Dr. Frank B. Gilbreth. The secretary of the chapter is J. D. Hackett, 2 East Twenty-third Street.

A contract for the construction of a 250-ton revolving crane to be mounted on the hull of the United States battleship Kearsarge has been awarded to the Wellman-Seaver-Morgan Co., Cleveland. It is the intention to transport the ship, under its own power, with turrets and guns on board, to any port where the crane service is required. Preparatory to the mounting of the crane, the guns, turrets and armor will be removed, and a circular steel foundation, 60 ft. in diameter, will be constructed on the deck. The jib will be required to handle its maximum loads at far reaches and great heights. Two main hoist blocks, each having a capacity of 125 tons, will be suspended from the jib, side by side.

The National Society of Industrial Engineers has selected Milwaukee as the seat of the 1921 annual convention, to be held April 27 to 29 at the Auditorium. This announcement was made at the monthly meeting of the Milwaukee Society on Dec. 2 by Dwight T. Farnham, vice-president of the National organization, who was the guest of honor. Mr. Farnham spoke on "The Industrial Situation in Europe."

Three Shifts in the Steel Industry

Results of an Investigation Covering Plants of Twenty Companies Which Have Adopted the Eight-Hour Turn—The Questions of Increased Cost, Increased Force and Increased Output—Testimony Not Uniform on All Points, but Largely Favorable to the Short Day

IN recent months Horace B. Drury, formerly of the Economics Department of Ohio State University and lately with the Industrial Relations Division of the United States Shipping Board, visited iron and steel plants in the United States working under the three-shift system. At a largely attended meeting in the Engineering Societies Building, New York, on Friday evening, Dec. 3, Mr. Drury presented the results of his investigation before the Management and Metropolitan sections of the American Society of Mechanical Engineers, the New York section of the American Institute of Electrical Engineers and the Taylor Society. The investigation was directed from the office of Morris L. Cooke, consulting engineer, Philadelphia, with whom Mr. Drury was associated for the purposes of the inquiry. Mr. Drury's report, apart from the charts accompanying it, consisted of about 16,000 words, of which he presented an abstract at the meeting. Below is given an extended synopsis of the report, many portions appearing in their entirety.

Extent of the 12-Hour Day

The actual percentage of steel industry employees who under the two-shift system have been employed twelve hours a day has been variously estimated at from 26½ to 52 per cent. The truth of the matter would seem to be that, so far as concerns those continuous operation processes which make up the heart of the steel industry, such as the blast furnace, the open-hearth furnace, and most types of rolling mills, together with the various auxiliary departments necessary to support these processes and make a complete plant, the bulk of the employees work 12 hours. The proportion of 12-hour jobs in these places is not a full 100 per cent, for the reason that in many of the departments there is a certain amount of work, usually of a common labor or mechanical type, which can be concentrated in daylight hours and is commonly organized on a 10-hour basis. But all the shift men, all the men whose presence is essential to the carrying on of the processes, from the chemist and bosses down to the lowest helper—the technical graduate, the American-born roller, and the unskilled foreigner — all these, with very few exceptions, work 12 hours. Most likely the percentage of 12-hour workers for the whole plant—which we are assuming is entirely, or almost entirely, devoted to the more fundamental steel processes—will be considerably over 50 per cent, possibly two-thirds.

The Seven-Day Week

It should be added that in the case of blast furnaces there is not only the 12-hour day but the seven-day week, and with the seven-day week there is associated one very objectionable feature and that is the 18-hour or 24-hour turn which comes to one-half the men whenever the day shift and the night shift exchange places. The seven-day week is also a common feature of open-hearth work, though some open-hearth furnaces operate only six and a half days a week, and some only six. Rolling mills rarely operate longer than six days a week.

Why the 12-Hour Day Persists

The development and continuance of the 12-hour day in the steel industry was the rather natural outcome of special conditions, an understanding of which must precede any intelligent approach to the problem of putting the steel industry on three shifts.

In the first place it is of the utmost importance to understand that most of the work in the steel industry is quite intermittent in character. In most plants one is told that a man does not work more than six or seven hours on a 12-hour turn, and to one passing through the works this is the general impression conveyed.

At one of the blast furnace plants visited a measurement of the working time by efficiency engineers showed that on the average the men were employed less than 50 per cent of the time. Much the same thing is true of open-hearth work, and in the case of rolling mills there are apt to be long waiting periods, or, especially in certain kinds of work, the men are apt to work in spells.

So in all these main branches of the industry, the work is in almost all cases highly intermittent, and while the men are in the plant 12 hours, it is doubtful whether on ordinary days they are actually occupied as long a time as are the men in most 10-hour, and perhaps in a good many 8-hour plants.

Men Do Not Work Hard

Nor during recent years has the work which the men perform when they are working usually been

Results at Three-Shift Plants

Mr. Drury recently visited practically all of the 20 American iron and steel plants which are now running on three shifts. His conclusions are in substance these:

In order to get the shorter hours the men have been willing to make substantial concessions in daily wages. It has been found that a 25 per cent increase in hourly rates is ample to compensate the men for a four hours' loss in pay. To give all those now on twelve-hour work a 25 per cent increase in wages, and cut down their day from twelve to eight hours, would cost a manufacturer of pig iron about 21 cents a ton. If all the departments in a steel plant were to be changed from two to three shifts, with no increase in efficiency, exhaustive analyses made by the Government have shown that the total cost of steel products, including blast furnace, open-hearth furnace and rolling mill operations, could not, on the average, be increased more than 3 per cent.

By taking care, some manufacturers going on eight hours have been able to reduce their force of men 10 per cent—some more. Others have found that the quality of their open-hearth steel has improved and that the expense for fuel and wear and tear on furnaces has been substantially reduced. Others have found that their rolling mill output has gone up 20 or 25 per cent.

To-day, with the tendency to slack times in the steel industry and increasing unemployment, the three-shift system could be introduced with much less difficulty than in recent years—more willingness of the men to accept moderate wages and to increase their efficiency.

of a very heavy character. Once this was so. A good deal of heavy labor still remained at the time when Mr. Taylor did his celebrated work at Bethlehem. But nowadays you do not find the pig-iron handler or anybody shoveling ore. The pig casting machines, the open-hearth charging machines, not to mention the blast furnace skip hoist, the electric crane, and the mechanically operated rolling mills, have revolutionized the industry. There is a good deal of cleaning up work that is not pleasant while it goes on, and odd jobs of varying degrees of difficulty, considerable shoveling at times around the open-hearth furnace, and severe labor on the hand-operated rolling mills.

But for the most part the steel worker of to-day is simply moving levers, or watching and waiting while the heat and machinery do the work. There is still a large element of hazard, and in places a good deal of exposure to heat; but conditions for the most part are far from being of a shocking sort—especially when one has become used to the spectacular magnitude of everything and realizes that the machinery does not rest on the men.

But while the men may not be actually working all the time a certain force of men is needed for emergencies. The work in a steel plant is irregular in its irregularity. Some days everything goes perfectly and the work is slight. Other days there is a lot of trouble and for hours all hands will be needed. Furthermore, a part of the idle time, especially in the rolling mills, is due to waiting for ingots, or to time lost while changes are made in the rolls. The complete elimination of mishaps and badly balanced conditions, though highly desirable, would be unusually hard of attainment in an industry where the things to be correlated are as unwieldy as in the steel industry. So a condition has become general in which the managers choose to have on hand a fairly adequate number of men, working at an intensity which permits them to stay around for 12 hours.

Why Foreign-Born Workers Favor the 12-Hr. Day

So far as the men are concerned, they have for the most part acquiesced in the 12-hour day because physically the manner of work was such that they could stand it, and financially they were receiving in exchange for spending their spare time in the works an additional hour's pay for every extra hour they worked.

The typical steel worker, whose psychology has acquiesced in and done a great deal toward forcing the 12-hour day on the steel industry is an unmarried man without a real home in this country whose one idea is to earn just as much money as possible and then go back to Europe. Or he may be married, but working to bring over his family. Men of this special type would often be willing to work four extra hours for almost nothing. Outside is alien America. Inside is the one environment to which they have become in a measure accustomed. Oustide are the squalid streets and often wretched dwellings, and nothing special to do except to dissipate the money that one is trying to save. Inside are one's fellow workmen and companions.

In many plants lounging rooms are provided; and in some there are classes in English during the men's leisure time. One smokes, talks, reads if he is able to or cares to. On the night shift everybody sleeps a part of the time, from the boss down—though it is not officially supposed to be this way—and there is a good deal of sleeping in the daytime. Often, however, the day shift is only 11 hours long, the men feeling that if they are going to work at 6 P. M. anyway, they might as well go at 5, thus making a night shift of 13 hours and a day shift of 11.

The Worker and Shop Life

In fact, there has grown up among these foreigners, and among the Americans as well, a special mode of existence in which the shop rather than the home, or the other outside institutions, has become to a large extent the center of living. Just as sailors have learned to spend their lives at sea, miners to spend much of theirs underground, and traveling salesmen and engineers to spend much of theirs away from home, so the steel worker spends his life in the shop. And while to those of us in other callings this might seem like the last thing that we would want to do, to the steel worker himself this special mode of life is sometimes not without its attractions, and—especially after he graduates into an office—it may become a sort of glorious thing.

This, of course, is the idealistic side of the picture. Not all of the steel workers are of one mind as to the desirability of this manner of life. Nor is it all so rosy or satisfactory. But this picture is a true one to a very considerable extent, and keeping in mind always this great flood of foreigners whom love of money or some other ambitious motive has torn away from their old-cultural attachments in Europe and brought across the sea, it helps to explain the often repeated statements of steel men that they would be glad to abolish the twelve-hour day, but the men are against it.

War Labor Shortage a Factor

During the war, and then again during a period of many months beginning not so very long after the armistice, it was so difficult to get men as to constitute an important if not a decisive factor in keeping many steel manufacturers who might otherwise have gone on three shifts from doing so. That the sudden introduction of the three-shift system would have put the steel industry to a real hardship if not an impossible task is evidenced by the fact that the shortage of labor even without going on three shifts was such as to make necessary unusual measures. Thus in the last year or two there has been a constant stream of negro and in some places Mexican labor moving into the steel industry.

Possibly the shorter day would in the end widen the group of labor to which the steel industry could appeal, and in time be its own solution to the problem of labor shortage. But at best this is problematical and would not prevent a difficult situation from arising at the outset. Besides the shortage of labor, the shortage of houses in steel towns has presented another very serious obstacle.

Reasons for Three Shifts

While the general opinion of well-informed steel men, even those who are very much in favor of three shifts, is that the twelve-hour day is not hard on the men physically, such a statement is probably only approximately correct. It is hard to believe that twelve hours in the shop is as good for a man physically as eight hours in the shop and the balance outside. It seems possible that if we had health records as accurate as those which we will later examine for the quality of open-hearth steel, we would find that eight hours would keep a man in better health and increase his longevity in comparison with what it would be under twelve hours.

When something goes wrong on the inside of the blast furnace, when the open-hearth furnace needs constant atttention during a long period of hours, then there can be no doubt that the twelve-hour day is a strain. Also the twelve-hour day when joined with the seven-day week makes an especially vicious combination. It means that once every two weeks or so a man is on continuous duty for eighteen or twenty-four hours, while only once during this two weeks' period does he get off for any longer period than twelve hours. The system is without a factor of safety, so that when emergencies compel a man to work overtime, or stand some one else's turn, strain at once sets in. The long hours also have the indirect effect of stimulating a man to excess when once in a while he does break over the traces and take a day or several days off.

What Kind of Citizens?

Yet the principal argument against the two-shift system is not the physical argument. It is not so much because of what goes on inside the shop as because of what a man misses outside that the steel workers in these later days are beginning to change their minds about the advantage of the twelve-hour day; while many other persons, both outside and inside the steel industry, are becoming concerned over the same problem.

What sort of a home life, one hears it asked on all

sides, can a man have who, including the time lost in coming and going, is on the job practically thirteen hours every day? For a few years the ambitious, newly-arrived immigrant may seek such a life; and throughout life, the dull man, or the one-interest-in-life man, may run on contentedly on this schedule. But any definite continuation of such a system for a block of several hundred thousand persons would simply mean the accentuation and continuance in American life of those lines of class and culture which immigration has already made too dangerous and deep. Who wants to have in America a class of men who do not know what to do with themselves unless they are under some one else's orders? Is this the way to raise the general level of literacy and personal capacity, and build up in America a civilization in which we may take pride? The argument against the twelve-hour day based on the proportion of a man's time which it consumes is in short simply unanswerable both from the standpoint of individual freedom and development, and from the standpoint of national power and culture.

The Future of the Labor Body

There is, however, another objection to the twelve-hour day which should appeal especially to the members of the Taylor Society, and to all those engineers who are interested in the more effective utilization of human labor; and that is the fact that, so long as the steel jobs are on a twelve-hour basis, the way is practically closed against the building up in the industry of any substantially more efficient or responsible labor force. The attitude of the workman, in feeling that he must hang back from work about half the time; the attitude of the foreman who feels that to get anything done at all he must drive; the lax moral tone which must pervade an industry where sleeping is tolerated—all these cannot but be reflected adversely in the attitude of the men toward waste, toward care of tools and equipment, toward responsibility for quality in the product, toward absenteeism, and toward the development of a scientific spirit which will seek to make a little labor go a long way. Who will deny that in the long run a brighter future is bound to lie before an industry which has learned that work is work, and has decided that long, dull hours, and half asleep workmen will no longer do?

Three Shifts in Other Industries

What, taking the country as a whole, is the drift to-day in matters of hours of labor? The steel industry is the very last of all the industries in the United States in the matter of eliminating long hours. The chemical industry here ranks next to the steel industry, but the chemical industry in recent years have made great strides toward changing from the two-shift to the three-shift system. The glass industry, which was once on two shifts is now for the most part on shorter hours. In coal mining there are some pumpmen and others who work twelve hours; but the proportion of such persons in the whole industry is small. The paper industry was once on two shifts and still is in some localities, but most of the plants covered by the study of the United States Bureau of Labor statistics evidently had gone to the shorter day.

Railroading not many years ago operated on long hours; but first the basic eight-hour day was introduced and now the actual eight-hour day is rapidly coming in. Even on ships the three-watch system became universal for American ships in 1919, the only exceptions now being radio operators, and the sailors and stewards on the Great Lakes.

Three Shifts the Rule in Europe

In Great Britain the movement towards three shifts was begun in blast furnaces as long ago as 23 years; and by ten years ago was so well under way as to be the rule in the sheet and tin-plate industry of Wales, and a common practice in the blast furnaces of the north of England. The late war retarded the rounding out of the three-shift system in England, but in March, 1919, those furnaces and other branches of the steel industry which had not already done so went over to three shifts; and to-day persons returning from England state that the three-shift system is the accepted practice throughout the English steel industry and is working to the satisfaction of all concerned.

In Belgium an agreement was entered into between the employers and workers by which beginning with Jan. 1, 1920, the eight-hour day was to be observed for blast furnaces. In France, a law of April 23, 1919, established the principle of the eight-hour day, leaving to public administrative regulations the fixing of the conditions under which the principle should be applied. Without waiting for such regulations to be issued, however, the French employers and employees in the metal industry, and a number of other industries, made their own agreement, to go into effect on June 1, 1919.

In Germany the law also limits the working day to eight hours, subject to such exceptions and conditions as may be defined by decree or administrative order. In Sweden the 48-hour week is generally applied in iron works. In Spain the eight-hour day was first adopted by agreement for iron and metal workers in a long list of cities, and then effective Oct. 1, 1919, the eight-hour day was established by royal decree as the general rule for all industries. In Italy there is an agreement limiting hours in the iron and steel industry to eight hours a day.

Unless it be in the Orient there is, therefore, no important seat of the steel industry present or prospective excepting the United States, where the two-shift system has not already passed away. It is to be hoped that in this matter we will not try to hide behind the Japanese, Chinese and Hindus.

Experience at Five Plants Working Three Shifts

THE steel industry is face to face with the inevitable. The change is coming; and the chief question is not whether it will come, but in what manner is it to be brought about? How will it work? How much will it cost? Is it possible to bring the change about so that instead of its being a financial loss, it will be a gain? It was in order to obtain light on the answers to these questions that during the last three months I have visited practically all of some twenty steel plants, which, seeing how things were going, have alreday changed from two to three shifts. And it is the results of the experiences of these companies which I propose first to illustrate and then to summarize.

Before this study was started there was no exhaustive list of three-shift plants, and the people in the plants themselves usually knew of only one or two other plants which had gone on three shifts. So the method of discovering the plants was largely accidental, and almost up to the end of the study new plants were being found.

Commonwealth Steel Co.

The Commonwealth Steel Co. was the first of any of the companies mentioned to go on three shifts and we are indebted to a scientific study made by R. A. Bull, then production manager of the company and later president of the American Foundrymen's Association, for some of the most exact data that have been collected on the relative efficiency of two-shift and three-shift work.

The business of the Commonwealth Steel Co. is the making of steel castings. As foundry work is rarely carried on as a continuous operation, the only department of this company with which we need concern ourselves is the open hearth department, which contains four open hearth furnaces—though some mention will be made of the boiler room. The Commonwealth Steei Co. put its open-hearth department and boiler room on three shifts in 1911. Chart I shows the results of making the change from two to three shifts on the labor efficiency of steel making, in particular as regards the quality of the product, the conservation of fuel and

materials and the efficiency with which the furnaces were regulated.

In order the more completely to shut out all disturbing factors, Mr. Bull limited his study to the four weeks immediately preceding and the four weeks immediately following the change in shift systems, because in this period no change was made in other conditions about the plant.

It was not to be expected, of course, that anything like the full benefits of the shorter hours would be realized at the very start, particularly in advance of any special effort to get better efficiency. Mr. Bull found that on those points where it was possible and fair to extend the comparison another four weeks, the second four weeks of three-shift operation showed a marked gain over the first. Thus in the amount of extra pig iron charged, the weight before the change in shifts was 556 lb., the first four weeks after the change it was 424 lb. and the second four weeks 137 lb.

Mr. Bull's figures deal chiefly with the quality of the product. With C. M. Cooke, the present open-hearth superintendent of the Commonwealth plant, a man of wide experience in open-hearth work, not only in the Commonwealth plant but in twelve-hour plants in many places—with Mr. Cooke, I took up the question as to the way in which the men regarded the three-shift system and also its effect on open hearth output. Mr. Cooke testified that when once the men get accustomed to the three-shift system they are very much in favor of it and will not go back to two shifts even though tempted by much larger wages. The twelve-hour day keeps a man away from his home and family too long.

Also on the matter of output, Mr. Cooke testified that while the Commonwealth plant had been on three shifts since before he went with them, he felt sure, as a result of his experience with both methods of operation, that the output of an open hearth furnace could be increased 10 per cent within six months of its going on three-shift operation. One has to go about it in the right way, however. The men tend, on three-shift opereation, to run along in much the same manner of working as under two-shift operation, talking, reading the newspaper, sleeping, and in general conducting themselves much as they would at home. As long as all this is allowed the results will not be radically different from what they were before. But by putting an end to these habits and developing in the plant a condition of alertness during the eight hours while the men are on duty, great changes can be accomplished.

After about ten years of three-shift management, a condition prevails in the Commonwealth open hearth department in which the men are constantly on their toes, by day and by night, watching the furnaces so carefully that the heats are obtained on schedule. Not only is output better, larger, and more regular, but there is a saving of materials, of wear and tear on the furnaces, and a prolongation of the life of the furnaces.

In going from two to three shifts the Commonwealth Steel Co. increased the hourly wage rates paid in its open hearth department by from 16 to 22 per cent.

In the boiler room it was found possible slightly to reduce the number of men on duty at any one time, so that the total wage costs per twenty-four hours was a few cents lower on three shifts than it had been on two, after allowing for advances in hourly rates of 14 and 19 per cent. Chart 2 shows the way in which this worked out, and also the improvement in the evenness of steam pressure.

National Enameling & Stamping Co.

Located in the same city with the works of the Commonwealth Steel Co. is another three-shift plant which includes not only open hearth furnaces—ten in number—but bar, plate and sheet mills. The National Enameling & Stamping Co., which manufactures at its Granite City works the steel required by its chain of enameling factories (as well as steel for the general market) made the change gradually, department by department, because the men had asked for it.

Chart 3 shows the various departments with the number of men in each department working eight hours, 10 hours and 12 hours, as things are arranged this year. It will be observed that the shift men are on eight hours but that the day workers are on ten, with a few odd men who are working twelve. The wage adjustment upon which the open-hearth men went on the shorter day was an increase in hourly rates of 12½ per cent. The company figures that the net increase in labor cost for the open-hearth work due to the change in the shift system was about 6 per cent. The output of the open-hearth furnaces has been increased 10 per cent per furnace during these six years.

In the case of the universal mill, the change from two to three shifts was made without any increase in labor cost. This was because there was a substantial increase in output, the output now being 25 per cent larger than it was six years ago. Not quite all of the increase in output is due to the change from two to three shifts, but the company estimates that at least 20 per cent increase in output is due to the shorter day. I have come across quite a number of plants where output on rolling mills has been increased in just about

Various Plants Having the Eight-Hour Day

Taking first blast furnaces, the following plants are working their blast furnaces on three shifts: The Colorado Fuel & Iron Co. at Pueblo; the Inland Steel Co. at Indiana Harbor, near Chicago; the International Harvester Co., at South Chicago; the Ford Motor Co.'s River Rouge plant, at Detroit; the McKinney Steel Co., at Cleveland; the Upson Nut Co., Cleveland; the Adrian Furnace, Dubois, Pa.; the Punxsutawney furnace, at Punxsutawney, Pa.; and a furnace or furnaces at Josephine, Pa.

This list does not include any plants for California, as I went no further west than Colorado, but it is said that the steel industry of California, whatever it is, is on three shifts. The Iroquois Iron Works, a plant of the Steel & Tube Co. of America, with several stacks located at Chicago, also operated on three shifts with success for some months preceding the steel strike. Some five of the plants listed above have steel works and rolling mills as well as blast furnaces, and these departments are also on three shifts.

The following plants, which have no blast furnaces, operate open-hearth furnaces and rolling mills on three shifts: The Kansas City Bolt & Nut Co., Kansas City, Mo.; the National Enameling & Stamping Co., Granite City, Ill.; the Andrews Steel Co., Newport, Ky.; the American Rolling Mill Co., Middletown, Ohio; the Trumbull Steel Co., Warren, Ohio; the West Penn Steel Co., Brackenridge, Pa.; Follansbee Bros. Co., Follansbee, W. Va.

The following plants having open-hearth furnaces but no rolling mills are on three shifts: the Commonwealth Steel Co., St. Louis (works in Granite City, Ill.); the Duquesne Steel Foundry, Corapolis, Pa.

The Allegheny Steel Co., Brackenridge, Pa., has its open-hearth furnaces but not its rolling mills on three shifts (aside from sheet mills). The Hoosier Rolling Mill Co., having a rolling mill at Terre Haute, operates on three shifts.

In this list of three-shift plants no account has been taken of plants which have only sheet or hoop mills on three shifts, as that is the common practice everywhere, nor has any account been taken of plants which have some isolated department on three shifts, as is sometimes true of a blooming mill or Bessemer converter.

CHART 1—COMPARATIVE EFFICIENCY TWO-SHIFT AND THREE-SHIFT SYSTEMS, OPEN-HEARTH WORK—Commonwealth Steel Co.

	12-Hour Shift	8-Hour Shift
General results:		
Extra pig iron charged, lb	556	424
Fuel oil consumed per heat, gal	1275	1138
Fuel oil consumed per ton of metal charged, gal	55	49
Longest intervals between reversal of burners, min	28	26.7
Cracked castings, per cent	0.49	0.37
Chemical tests:		
Maximum phosphorus, per cent	0.022	0.018
Maximum sulphur, per cent	0.025	0.025
Average carbon, per cent	correct	correct
Average phosphorus, per cent	0.011	0.011
Average sulphur, per cent	0.022	0.022
Average manganese, points under	2	correct
Average silicon, points over	1	correct
Physical tests:		
Maximum yield point per sq. in., per cent under	2.5	7.7 (over)
Maximum tensile strength per sq. in., per cent under	4.7	1.4
Maximum elongation in 2 in., per cent under	5	3
Maximum reduction of area, per cent under	8.3	7.6
Average yield point per sq. in., per cent	13	15.5
Average tensile strength per sq. in., per cent over	5.9	5.8
Average elongation in 2 in., points over	4.6	4.1
Average reduction of area, points over	7.9	7.2

this percentage, due, the managements say, very largely, to the change to the shorter shift.

The plate mill was put on an eight-hour day one year ago; that is, where it had before run two 10-hour shifts it was arranged to do the work in two 8-hour shifts. About the same production was obtained in eight as in 10 hours, not because the men worked faster, but because the limited shearing capacity had kept down the amount of work which could be turned out on the 10-hour shift. When the shift was reduced to eight hours the work was not held back in this way.

Less than half of the men in the mechanical department were ever on 12 hours; but those that were (with a few exceptions) were changed from 12 to eight hours three years ago. It involved an increase in cost, but the figures are not obtainable. The boiler house is the only department in which the company is not satisfied with the change to the three shifts, this being because it feels that the men are here disappointed over the reduction in daily earnings which the change involved. The increase in labor cost to the company in this department was 10 per cent.

In making the change to three shifts, the National Enameling & Stamping Co. always increased the number of men 50 per cent, excepting a very slightly smaller increase in the boiler house. The company believes that there are noticeably less accidents among men working eight hours than among men working 12 hours, and the general impression of the management is that the health of the employees is better while working 8-hour shifts than 12-hour shirts. Excepting in the one department, the boiler house, the company is glad for the change to three shifts.

Colorado Fuel & Iron Co.

The Colorado Fuel & Iron Co. has a steel plant at Pueblo, Colo., having six blast furnace stacks, 15 open-hearth furnaces, a Bessemer converter, and a variety of mills for rolling blooms, rails, rods, etc., as well as departments for making wire, various wire products, bolts, etc. There are about 6200 employees.

The Colorado Fuel & Iron Co. has an agreement with its employees, under their industrial representation plan, by which it pays the same wages as are paid in the East. When, therefore, it was learned in October, 1918, that the Steel Corporation was to introduce the basic 8-hour day, the Colorado Fuel & Iron Co. proceeded to call its men together in meeting for the purpose of working out methods for putting the basic eight-hour day into effect. It happened, however, that after the company had gone pretty far towards arranging with its men for the basic 8-hour day, one of the groups called into conference declared that what they wanted was not the basic eight-hour day but the actual 8-hour day. And it was agreed that this group should have the actual 8-hour day, at an advance in hourly rates of 10 per cent over the base rates prevailing in the East.

Daily Pay Reduced

Under the basic 8-hour day, the steel worker who works 12 hours is paid for 14, an increase of one-sixth, on the average, over the basic hourly rates. So where the Colorado Fuel & Iron Co. was offering to employ its men 12 hours, at an average increase of 16 2/3 per cent in hourly rates, the group of men asked that they be employed eight hours, at an increase of 10 per cent in hourly rates. The 8-hour day meant less than two-thirds of the earnings which the 12-hour day would have meant. Nevertheless, as soon as it was learned that this one group of men had obtained the actual 8-hour day, all the other groups which had already been fixed up came back, and the thing ended by the whole plant going on eight hours.

The reason why the company was dubious about the new arrangement was the fear that when the men got their checks they would regret their agreement; but as a matter of fact there was very little complaint.

CHART 2—COMPARATIVE EFFICIENCY TWO-SHIFT AND THREE-SHIFT SYSTEMS, BOILER ROOM—Commonwealth Steel Co.

	12-Hour shift	8-Hour shift
Steam pressure:		
No. of times when steam pressure fell below 110 pounds	77	42
No. of times when steam pressure fell below 105 pounds	9	3
No. of times when steam pressure fell below 100 pounds	1	0
Manning:		
No. of head firemen required for 24-hour day	2	3
No. of second firemen required for 24-hour day	3	3
No. of coal passers required for 24-hour day	3	4
Total No. of men required for 24-hour day	8	10
Total man-hours per 24-hour day	96	80
Increases in hourly wage rates:		
Firemen		19%
Coal passers		14%
Labor cost per 24-hour day	$19.50	$19.12

There is no question that the men regard the winning of the actual 8-hour day as a very great achievement. It was not as difficult for the men and their families financially as might appear, for their hourly rates did go up 10 per cent; also many of the men went at this time from a six-day to a seven-day week, thus adding a substantial percentage to their earnings. So that while the men were giving up very large possible earnings which the basic eight-hour day would have given them, the reduction from what they themselves had been earning was not so great. The company also is very highly pleased with the new system.

Force Per Shift Unchanged

In view of the fact that the shorter hours were introduced without increase in labor cost to the company, there was no reason to expect that the men would feel under obligation to turn out a larger output, or double up on jobs. So the labor force was increased 50 per cent wherever the change was made from 12 to eight hours. So far as the blast furnaces and open-hearth furnaces were concerned there was no increase in output expected or realized. Chart 4 shows the tons produced per hour on the rolling mills during the first six months of 1918, which came before the change, and the first six months of 1919, which came afterward.

It will be observed that no gain in production was shown by the 12-in. and 20-in. mills. These are an old type of hand mill and the wages paid are the Amalgamated scale, and it was felt by the management that

CHART 3—DEPARTMENTS IN A STEEL PLANT, AND HOURS WORKED IN EACH, UNDER THREE-SHIFT SYSTEM—National Enameling & Stamping Co.

Department	8-Hour Men	10-Hour Men	12-Hour Men*
Tin and sheet mills	872	83	134
Finishing department	124	193	52
Open-hearth department	151	11	...
Universal mill	129	47	6
Plate mill	55	51	6
Mechanical department	234	12	7
Boiler house	69	...	...
General	6	102	6
Total (2350)	1640	499	211

*One department not on three shifts

CHART 4—COMPARATIVE EFFICIENCY TWO-SHIFT AND THREE-SHIFT SYSTEM, ROLLING MILLS—Colorado Fuel & Iron Co.

	36-in. Mill	Rail Mill	40-in. Mill	No. 1 Rod Mill	10-in. Mill	12-in. & 14-in. Mill	12-in. Mill	20-in. Mill
Tons per hour								
Jan.-June 1918	41.42	37.99	31.66	16.54	8.62	9.49	1.69	4.24
Jan.-June 1919	52.48	47.81	33.90	19.61	9.84	7.95	1.66	3.86
Increase or decrease	11.06	9.82	2.24	3.07	1.22	— 1.54	— .03	— .38
Per cent	26.7	25.9	7.08	18.55	14.15	—16.2	—1.77	—8.95

the tradition with regard to the output that should be produced helped to keep these mills about stationary. The 12-in. and 14-in. mill also shows a falling off in production, and there seems to be no good reason why this should have been so.

The other rolling mills all show a gain in output, in most cases a substantial one. It should be explained, however, that the increase in production on the 36-in. mill and rail mill, which averaged about 26 per cent, was largely due to the fact that under the 12-hour system the mills had not been well supplied with ingots. Under the 8-hour system these mills were run just two shifts of eight hours each, and the facilities for heating the ingots are now adequate for keeping the mills supplied for the eight hours that they now run. So this increase in production was to a large extent only indirectly due to the shortening of hours.

Gain Due to Shorter Hours

The better showing on the three other mills was attributed by the management in the main to the shortening of hours. It will be observed that the best record was made by the No. 1 rod mill, which showed an average gain for the half year of 18½ per cent. These men were on tonnage rates, both before and after the change, as were also the men on the 10-in. mill, and some of the other mills, and they started out with the determination of doing as well financially on eight hours as they had formerly done on 12. They did not make it, evidently, but the increase in tonnage was substantial.

While the figures show that increased tonnage is a possibility rather than a necessity under the three-shift system, it might be observed that the mills on which there was an increase of output were much more important than those on which output did not increase. In fact, two of the latter mills only operate one shift each, and the other only two shifts (of eight hours); so that it turns out that the total shifts operated by the mills which showed increase in production was 13, and the number of shifts on the mills which did not show increases, four.

In considering the eagerness of the Colorado employees to go on three shifts, it should be remembered that the percentage of Americans is about twice as large at Pueblo as in the steel mills in the East, and also that sentiment regarding the eight-hour day is much more pronounced in the West than in the East.

International Harvester Co.

The International Harvester Co., through its ownership of the Wisconsin Steel Works at South Chicago, operates three blast furnace stacks, besides Bessemer converters, blooming and bar mills, a coke works, and various auxiliary departments. At one time two-thirds of the employees were on 12 hours. About 1913 the Bessemer and bar mills were put on three shifts, and in 1919 all continuous processes were put on three shifts. At a later date the 8-hour day was introduced into all departments in accordance with the wishes of the men as expressed through their industrial council plan. There is an arrangement by which each employee gets off one day a week.

Only 35 Per Cent More Workmen

In making its wage adjustments the International Harvester Co. went just half way with its employees, and the men are still paid ten-twelfths of what they would get in a 12-hour plant. This 25 per cent increase in hourly wage rates has, however, been partly offset by the fact that, taking the average for all departments, the labor force was not increased 50 per cent, but 35 per cent.

The management went over this matter of taking on new men very carefully with its foremen; it was figured out just what new men would have to be taken on, where they could be obtained, and how they could be trained. There was also some increase in tonnage. Prior to the time when the rail strike introduced abnormal conditions in production the increase in output had run along for six months at a rate which almost, though not quite, kept labor cost down to the former level. Conditions have not been normal for a long enough period to know whether it would be possible permanently to maintain production at a standard that would mean no increase in labor cost.

CHART 5—CONDITIONS UNDER WHICH THREE-SHIFT SYSTEM WOULD INVOLVE NO INCREASE IN COST OVER TWO-SHIFT SYSTEM

	Changing hours of shift workers from	and increasing men's hourly rates 25%		but taking on only 35% more men		would mean a small increase in	if daily output is on the average increased 10%	labor cost would remain practically stationary
		Rate per hour	Wages per day	on a shift	Per day	Daily payroll for shift men		Per ton
2-shift system	12 hours	60c	$7.20	10	20	$14.40	170 tons	$.85—
3-shift system	to 8 hours	75c	6.00	9	27	16.20	187 tons	.86—

There has been difficulty sometimes in getting common labor in competition with neighboring two-shift plants, but as regards the bulk of the employees the company feels that it gets a much better pick of men than while it was on two shifts. While the company does not wish to influence other companies one way or the other as regards their shift systems, one of the very last things that the management of the International Harvester Co. would consider doing would be to go back to two shifts.

American Rolling Mill Co.

The American Rolling Mill Co. has blast furnaces at Columbus and rolling mills at Middletown and Zanesville, Ohio. Their three-shift system operates at Middletown, where there are two plants which constitute the main works of the company and employ about 4000 men. They have there 12 open-hearth furnaces, a blooming mill and bar mill, a large number of sheet mills and allied departments. The management of the Middletown plants have had in mind going on three shifts for a number of years, but they waited until they could make the change in the way which seemed to them the right way. They determined that if they went on the three-shift system they would contrive to do so without raising labor costs, or on the other hand lowering wages.

One of their early steps was to call the men of the various departments together, tell them that they were considering introducing the three-shift system, but that their co-operation would be necessary if it was to be a success. The men responded effectively and a great many of the

CHART 6—MAXIMUM COST OF INTRODUCING THREE-SHIFT SYSTEM INTO A BLAST FURNACE, ASSUMING THAT HOURLY WAGE RATES ARE ADVANCED 25% BUT THAT THERE IS NO INCREASE IN EFFICIENCY

Total labor cost of making a ton of pig iron	$1.25 a ton
Proportion of labor cost paid to present 12-hour workers (2/3)	0.83 a ton
Increase of 25% in pay-roll of shift workers	0.21 a ton
Selling price of a ton of pig iron	40.00 a ton
Cost of ore required to make a ton of pig iron (2 tons ore)	16.00 a ton
Maximum cost of abolishing 12-hour day (assuming no increase in efficiency or elimination of jobs)	0.21 a ton

suggestions which were adopted originated with the men on the job.

The large rolling mills were put on a three-shift basis Feb. 1, 1920. The sheet mills had always been on three shifts and the galvanizing department had gone on about 1917. The management of the American Rolling Mill Co. feels very strongly that the period from February 1 to the present time is not long enough to warrant the drawing of final conclusions regarding the results of three-shift operation.

Gain in Rolling Mills

Owing to the careful study made of the manning of the rolling mills, the increase in force was from 200 on two shifts to 222 on three shifts, an increase of 11 per cent. The output increased 15 per cent. The earnings of the men, who had been placed on a bonus system coincident with the change to three shifts, were as great as they had been on two shifts.

The steel producing department was put on three shifts about April 1, 1920. Here the extra shift was taken care of by a 15 per cent increase in labor force, the institution of floating gangs being of help. Output was not increased. Certain standards of performance were set up by the attainment of which the men would earn as much money as formerly. However, they have so far fallen short of the desired standards, and are making a little lower weekly earnings than formerly. Labor costs in this department have shown some increase.

In practically all the service departments where the change has been made from two to three shifts it has required an increase in the number of men of about 40 or 45 per cent. The management hopes, however, that the increase in costs resulting in the service departments and some producing departments will be balanced by the savings in those producing departments where material increases in production have been secured. The net result should be a reduction in overhead cost.

One of the things that the management had hoped to accomplish was a cutting down of various kinds of waste, below the figure which existed under the two-shift system. It yet remains to be seen whether this can be accomplished.

Summary of Experience of Twenty Plants

IN the remainder of this paper I propose to draw a sort of composite picture of the experience of the entire 20 odd plants which, up to this time, have gone on three shifts, pointing out what may reasonably be expected of the three-shift system in the typical plant, and finally how things would be apt to work out if the whole industry should make the change.

All Plant Managers Glad of the Change

Perhaps the one thing that stands out the most obviously as a result of my visits to and talks with the managers of the three-shift plants, is the fact that practically all of them are glad that they made the change. Not that they had no problems to meet, but they were in practically all cases looking ahead, not back. In going around I now and then heard of a plant which had been on three shifts and gone back to two, and at first I thought that here I would learn the reverse side of the story. I made a practice of going out to such plants—the number in recent years has not been great—but I did not find them to be centers of dissatisfaction with the three-shift system. I found that in a good many cases where it was said that plants had gone back to two shifts it was not so, and in the few cases where they had done so the reason when inquired into usually proved to be some more or less accidental thing, and I can remember only one plant where there seemed to be a deliberate going back because of a feeling that the two-shift system was more satisfactory.

Can the Short Turn Pay for Itself?

The main question that has seemed worth while looking into as regards the three-shift system has been the fundamental question as to what extent, if any, the greater wage cost due to compromise on hourly wage rates at the time hours are shortened can be offset by increased efficiency; that is, to what extent can the shorter day be made to pay for itself.

Where the amount of work accomplished depends on the energy that a man puts in, it is believed that he will do as much in eight or 10 hours as in any longer period. But while the steel men feel that this is true in most industries and in a few departments of the steel industry, they do not believe that a day as short as eight hours can actually be made as productive per man-day of eight hours as is the present 12-hour day, for the reason that most of the work around a steel plant is not of a kind that a man can pitch into and get done. He must wait. I found, as a matter of fact, that in almost all cases the three-shift system is being introduced at some increase in cost—that is, in cases where the men do not go on at practically the same hourly wage rates as before. And it seems likely that if all the steel plants in the United States were to go on three shifts they would most of them find that labor costs had risen.

While costs are likely to go up some at the start I think there is substantial reason for believing, in view of what has already been done in some of the plants, that before long the adjustment will work out along lines that will mean very little if any higher cost. Chart 7 shows a situation under which, if it could be obtained, steel would be made at substantially as low a labor cost under the three-shift system as under the two-shift system. If hourly wage rates are compromised half way, the force of men increased not a full 50 per cent, but on the average 35 per cent, and if output could on the average be increased 10 per cent, then the labor cost under three shifts would be practically the same as under two shifts.

Fewer Men to the Turn

The figure for a 35 per cent increase in men, instead of 50 per cent, is also a conservative one. In many plants exactly 50 per cent more men are employed on three shifts than on two, and most of them are close to the 50 per cent figure. But the 35 per cent standard has been attained by such large plants as those of the International Harvester Co. and Inland Steel Co., and a much better showing was made by the American Rolling Mill Co. It might be noted that the limitation to 35 per cent increase can be obtained, if, where 10 men are now employed on a shift, it is possible to get along with nine. That is, 27 men employed on three shifts is just 35 per cent more than 20 men employed on two shifts. It seems only reasonable to assume that with so large a reduction in the number of hours, it would be possible to cut out one man out of ten.

Increased Output

This figure for increased output of 10 per cent seems not very far away as an average. It is, of course, too high for a blast furnace. I know of no reason to expect greater output at all from a blast furnace on three shifts. Fortunately, in the case of a blast furnace the labor cost is small. In the case of the open-hearth furnace a 10 per cent increase in output would be an ambitious program. As regards rolling mills, the human equation enters in to a considerable extent, so that increase in output may be looked for. The amount depends on the type of mill and the opportunities for doing more rapid work. It would also depend some on the efficiency of the arrangements for supplying the metal to be rolled, and for shearing and taking away the finished product. On many mills, however, actual figures show that the increase in output may run up well toward 25 per cent.

However, the striking thing about the cost of the three-shift system is the smallness of the amount at stake, whichever way one looks at it. Suppose that there were no increase in efficiency at all, that the plant increased its force of shift men precisely 50 per cent, that the output is no greater in any department than under two shifts, and that the hourly wage rates are

raised 25 per cent. Chart 8 shows the maximum possible increase in labor cost under these circumstances.

In a good blast furnace plant the labor cost at present wage levels and efficiency should not be far from $1 per ton, to be safe we will say $1.25 a ton. Assuming that the change from 12 hours to eight would affect two-thirds of the men, the pay of these men under the two-shift system would amount to two-thirds of $1.25 or 83 cents per ton. An advance of 25 per cent in the hourly wages of these men would increase the labor cost per ton of pig iron by 21 cents. Considering the fact that pig iron sells for around $40 a ton, that the ore that goes into a ton when delivered at Pittsburgh costs about $16, the trifling risk involved in increasing the labor cost a maximum of about 21 cents is apparent. Likewise in open-hearth work the labor cost might be $1.30 a ton, to be safe we will say $1.50 a ton. The maximum increase in labor cost here, assuming no increase in efficiency, would be 25 cents. Thus the total increase in labor cost for the steel ingot would be not more than 46 cents, still a small figure for something that sells for about as many dollars. In the rolling mills the labor cost will run higher, especially where material is rolled several times, and into light shapes, as rods, sheets, etc. But in proportion as the product is put through many processes, the opportunities for getting higher labor efficiency increase, until at the sheet mill end of the process, no one questions that the shorter day means no added cost at all. In various of the rolling mills visited there has been no increase in labor cost.

Use of Leisure Time

In passing, one word should be said about what the men do in their leisure time. A good many people not in three-shift plants are worried about that. The managers of three-shift plants are not worried. Those extra four hours have been swallowed up as easily and unnoticeably as were the barkeepers. What the men do depends on what they are interested in. Some few are the worse off, though it is doubtful if they are any worse off for four hours of extra time every day than they would be for a day or two taken off irregularly under the old system. The majority of the men seem to profit by their free time, though the managements do not find the problem one to which they need to pay any special attention.

Changed Labor Conditions Favor Three Shifts

In September I was told on all sides by the managers of plants which had gone over to the three-shift system that while they had encountered no special difficulty in getting the extra men needed, it would be impossible for the industry as a whole to go over to three shifts because there was not sufficient supply of labor trained in the steel industry in the country to run the extra shift. While it is easy to exaggerate the difficulty of quickly finding and training men—some marvels along this line were accomplished during the war—I believe there was until a few months ago a good deal of reason for this feeling. To-day, however, these same steel manufacturers say that with the easing up in the demand for labor and with the tendency toward slack times in the steel industry itself, the time has already come or will come exceedingly soon when the whole industry could go over to three shifts without serious difficulty. In other words, the time is now here, or will very shortly be here, for which men in the steel industry have for several years been saying that they were waiting to introduce the three-shift system.

The three-shift system can be introduced by the manufacturer more easily and at less cost to himself now than at the time when the plants now on three shifts made the change. Not only will the men fall in with plans much more readily than they would have a few years or months ago, and with more moderate expectations with regard to increases in wage rates, but it would be much easier for the manufacturers to persuade labor to increase its efficiency so as to offset to a considerable extent the increased labor cost. If, indeed, we are face to face with a time of considerable unemployment in the steel industry, then this would be the time of all times to cut out one man's working 12 hours a day, and another's working not at all, and distribute the work so that all would have employment for a reasonable workday. Under these conditions the change can be made with the greatest benefit all around, and perhaps no cost anywhere.

Reduced Operations in the Mahoning and Shenango Valleys

YOUNGSTOWN, OHIO, Dec. 7.—Average operations in the Mahoning and Shenango valleys are below 50 per cent of capacity, indicating the slump which has overtaken the steel industry. But 28 of the 46 blast furnaces are active in the Valleys proper. Carnegie Steel Co. expects to blow in one of its idle Ohio Works stacks, which has been undergoing repairs, the latter part of this month. In the Mahoning Valley the Youngstown Sheet & Tube Co. is operating five furnaces, with one down; Carnegie Steel Co. five, with two down; Republic Iron & Steel Co. five with one idle; Brier Hill Steel Co. two and one down; A. M. Byers Co., operating Mattie furnace at Girard and the Struthers Furnace Co. Anna stack at Struthers.

In the Sharon district only five of the 14 blast furnaces are in commission.

Rosena furnace of the Carnegie Steel Co. at New Castle, Pa., which had been out of blast since April, 1920, was blown in last week.

Sheet mill schedules were slightly accelerated this week, when the Falcon Steel Co. started its plant on a 50 per cent basis. The hot mill department of the Newton Steel Co., which suspended the last three days of last week, started in full Monday.

Trumbull Steel Co. prepared to resume part of its open-hearth equipment, which suspended the middle of November after establishing a record run from September. In the meantime, most of the accumulated sheet bar tonnage has been worked off. The company planned to partially resume operations at the Liberty works. Production at the Trumbull works in Warren has been largely devoted to tin plate.

The Carnegie company is operating 13 of 15 open-hearth furnaces and the blooming mill, Bessemer department and finishing mills close to normal.

The Brier Hill Steel Co. is around 50 per cent., with its 84-in. plate mill active this week. The Republic Iron & Steel Co. is under 60 per cent, its sheet mills at Niles being down.

All tube mills in the Valley are going strong and are turning out more product, proportionately, than any other departments. This week the Youngstown Sheet & Tube Co. started an idle 9-in. bar mill. Four of the nine sheet mills of the Sharon Steel Hoop Co. were active at the beginning of the week.

Blast Furnace Gas Engine Developments

Recent developments of blast furnace gas engines made by the Cockerill Co., Seraing, Belgium, are described by Prof. H. Hubert, Liège, in the Nov. 19 issue of the *Engineer*, London, England. A new form of valve gear, it is stated, has been introduced, which is not only simpler, but gives such effective scavenging that over 20 per cent more power may be developed from a given cylinder than hitherto has been introduced, and by employing waste heat boilers a great deal of energy that used to be discharged into the atmosphere is now recovered. It is explained that breech end failures are now practically unknown in the Cockerill engines. An engine of 7400 b.h.p. with four double-acting gas cylinders arranged double tandem, which the company had built for its own power station shortly before the war, was dismantled by the Germans and taken to Germany, but it has been returned to the works at Seraing where it is now being re-erected.

More than 700 persons gathered in the grand ballroom of the Hotel Plaza on the evening of Dec. 3 to participate in an entertainment given by the employees of the Consolidated Steel Corporation, New York. The officers of the steel exporting company, headed by President E. A. S. Clarke, occupied boxes. Sketches and vocal and instrumental music by the members of the organization contributed to the evening's enjoyment.

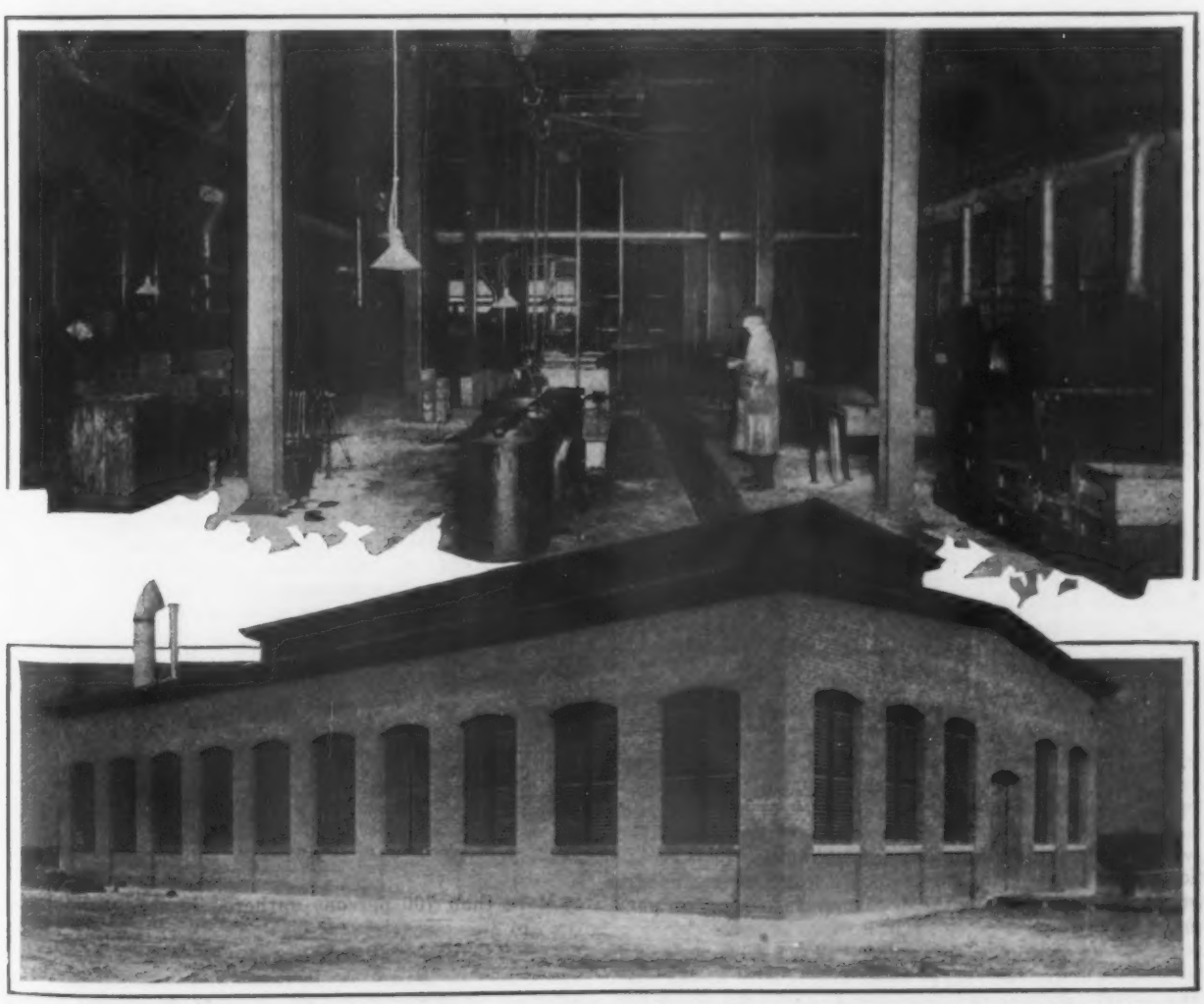
Modern Case Hardening Building at Providence

Features Include Arrangements for Maximum Ventilation with Minimum Light and the Dipping and Cooling Tanks

A NUMBER of interesting points in building and equipment design are incorporated in a case hardening building recently completed at the plant of the Universal Winding Co., Providence, R. I. The building is a one-story brick and steel structure, 50 x 80 ft., and 17 ft. in height, exclusive of a 6-ft. monitor. The floor is concrete, except in front of the large furnaces, and where the hot pots are emptied and stacked. This portion of the floor, covering about one-eighth of the total floor area, is fire brick laid in a cement mortar on a concrete base. By handling all hot material on the brick, spalling of the concrete due to excess heat is avoided. The window frames and sashes are of hollow metal construction, the sashes being a counterbalanced type glazed with wire glass, except in the monitor. Here, as no light is required, wood panels were substituted for glass, thereby reducing the heat loss through radiation in the cold weather. These panels are mechanically operated from the floor. In order to obtain maximum ventilation and minimum light, the window openings are covered with louvres or shutters. The walls are painted battleship gray, to avoid reflection and to assist in producing the darkness necessary for the determination of the heats.

The equipment consists chiefly of the high-speed, cyanide lead, electric and double oven oil burning furnaces with the necessary tanks. The layout is made with the idea of future development. The center of the building is occupied by the large dipping tanks—two steel and one concrete for oil, and one concrete for brine. The concrete tanks are 4 x 5 x 6 ft. deep inside dimensions, with 8-in. walls and 12-in. bottoms, all reinforced; a 12-in. wall separates them. The top of the tanks are set 28 in. above the floor, leaving part of the tanks below high water level. To prevent the water from leaking in and also to prevent the loss of oil and brine, the concrete was waterproofed by using hydrated lime. An 8-in. wall with a double line of reinforcement is a difficult proposition to pour and good results were obtained in these tanks by using a wet mixture with a fine aggregate, tamped carefully. Alongside these two concrete tanks is a third tank entirely below the floor. This is the cooling tank for the circulating system; it is 8 ft. square and 3 ft. deep, with 6-in. walls and 9-in. bottom. Being covered with checkered steel plates, it may be used as a dipping tank for large pieces.

The oil and brine are kept at an even temperature by means of the circulating system. In the large cooling tank there are two separate coils of 2-in. pipe about 7 ft. square, each containing 225 ft. of pipe. Connections are made from these to the tanks, one to the oil and one to the brine. The opposite end of the coils is connected, in each case, to a small circulating pump. This is the suction line. Each pump discharges in the center, at the bottom of the tank. Since the suction intake is above the pump and the head against discharge only 3 ft., the power required to operate the



Wood Panels in the Monitor and Window Louvres Provide Ventilation Without Light. The dipping and cooling tanks are in the center of the building

system is relatively small. The coils in the cooling tank are submerged in running water obtained from the river near at hand. By regulating the flow of water a constant temperature of oil and brine is maintained. The system requires 1000 gal. of oil. This quantity is small compared with the amount of oil required for systems which circulate water through coils and spray the oil over them, pumping the cool oil from the cooling tank. In this latter case it is necessary not only to fill the dipping tank, but also the cooling tank, while in the system installed here only enough oil to fill 225 ft. of 2-in. pipe is required in addition to that in the dipping tank. In the circulating water system a separate cooling tank is required for each circulation whereas only one tank is necessary for cooling both the brine and oil in the system in operation here. Besides this, the saving of pipe and power is a consideration.

By placing a floor grating around the soda tanks, at either end of the building, with a drain to the sewer, an excellent place is furnished for the drippings from the washed material and a wet floor is eliminated.

In the pure water tank, in order to aerate the water for the hardening of bushings and for mottling, a line of compressed air is run so as to discharge in the center on the bottom. This same effect results in the brine tanks due to the location of the discharge from the pump. Pure water, a requisite in hardening, is obtained from an artesian well 500 ft. deep, located at the plant, and is used for drinking purposes throughout the buildings.

Pipes for fuel oil, gas, compressed air, steam, pure water and river water are run to the building in a single underground trench and from there either on wall hangers or in floor trenches to the furnaces, tanks, etc. The wall hangers consist of 3-in. channel bars, with one side bolted to the wall between the window sills and the floor and the lines of pipe are hung on the other side with standard clips. Placing the pipes out from the wall in this manner leaves ample space for installation. Running from the mains to the machines, tanks, furnaces, etc., the lines are carried on inverted extension pipe hangers. No pipes are resting on the floor and all furnaces are clear of the wall. Keeping the floor clean is, therefore, an easy matter. The floor trenches, in which the pipe lines are run from the wall to the center of the building, are covered with checkered steel plates. These are laid in small sections so as to be easily removed.

Trolley beams are erected on either side and in the center of the building. Differential hoists were used on two of the trolleys, those over the tanks in the center and the cyanide and lead furnaces on the side. For speed in lifting and dropping the hot pots coming from the large furnaces, a four part chain line block and fall is installed. Each trolley was designed for a half-ton load.

Each furnace giving off fumes or gases is connected to an exhaust system. The fan is a multiwing type with a 25-in. inlet and outlet, and is of sufficient capacity to take care of all additional equipment requiring ventilation.

The building is heated by steam coils hung from the roof beams, and automatic sprinklers are used throughout. A wash room, with individual lockers, is partitioned off from the main floor.

Plans for the building were drawn up by the maintenace department of the plant, and constructed under their supervision.

SEATTLE IS HOPEFUL

Improvement in Business Expected to Come Early in the New Year

SEATTLE, Dec. 1.—Recently a prominent lumber concern here received an order from Japan for 500,000 ft. of lumber for early shipment, and other large inquiries are in the market for shipment to that country. This is the first lumber business that has come to Seattle from the Orient for months, and now that it has started again, the belief is that soon there will be some inquiries here for steel for the Orient, there having been practically no export inquiry over the last three or four months. Inquiry from the Philippine Islands, which for some time was active, has also fallen off, and export business in steel from this port has been almost dead for three or four months.

The acceptance of the March 21, 1919, prices by the independent steel companies is regarded here as being one of the best things done in a long time, and one that will do much to stabilize prices very quickly. It is not believed that steel prices can go lower than the March 21 basis so long as the present high level of wages remains, and this will give buyers confidence, something they have not had since the signing of the armistice, more than two years ago.

Some Business at New Prices

Local sales agents of Western steel companies already report that they have done some business at the March 21 figures, one interest having sold a round tonnage of hot-rolled steel bars. There has also been some business closed in cold rolled bars at the 3.60c. price, both these figures being those adopted by the Steel Corporation on March 21, 1919. Local jobbers, and also Eastern companies that maintain warehouses here, believe now that with prices fixed on the March 21 basis, there will be a better demand for steel very soon after the turn of the year. Inventory is now under way, the year's business is being closed, and until these two items have been completed not much increase in demand is expected.

The local sales managers of four or five of the large Eastern independent steel companies are now quoting the March 21 figures, and say their customers tell them that soon after the first of the year they will be ready to close for some tonnage.

Little Tin Plate Sold

So far very little tin plate business has been closed here for delivery in the first half of 1921. The amount of tin plate that will be bought by the salmon packers for next year will be very much less than usual. They all have heavy stocks from this year, and also have very heavy stocks of canned salmon on hand, the demand for which for some time has been very dull. The condensed milk trade is also well stocked, and the outlook for tin plate in this district for next year is not very good. A large consumer at Vancouver, B. C., has closed for some tonnage for first half, and has already sent in specifications for part of it. All the local agents are quoting on the basis of $7 per base box for first half.

All local sales agents are now quoting soft steel bars at 2.35c. at mill, Pittsburgh, but there is very little activity. The concerns that bought the shipyard material have considerable tonnage of steel bars which they are offering and selling at less than the equivalent of 2.35c. at Eastern mill. The Pacific Coast Steel Co., which rolls a limited range of sizes of steel bars, has lowered its prices to meet the lower Eastern market.

Steel Shipped Via Panama Canal

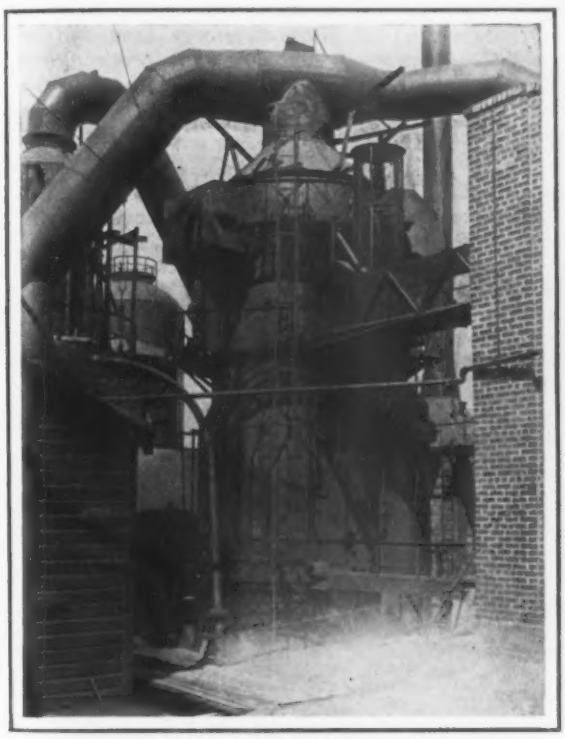
The lower freight rates on iron and steel products being named by the intercoastal lines is having the effect of diverting much tonnage from the railroads, and practically all the steel from Eastern mills that is coming into this market is being hauled by water via the Panama Canal. The water rate on plates is 70c., and on bars, structural steel and pipe is 75c. per 100 lb. from New York, and it is said that even lower water rates may be looked for in the near future. The saving effected by shipping by water over the all-rail rate is from $11 to $12 per ton, and the time made by the boats is almost as fast as by the railroads.

Notable Results with Mechanical Charging

Sheridan Plant of the Lavino Furnace Co. Increases Ferromanganese Output 25 Per Cent —Reduces Stock-Handling Labor Two-thirds

BY replacing its hand-filling equipment with mechanical charging apparatus, the blast furnace of the Lavino Furnace Co., at Sheridan, Pa., increased its production of ferromanganese from 71 tons per day average to 89 tons per day average; the force required for filling the furnace was reduced from 40 to 12 men per day. The savings effected, aside from any profits by reason of increased tonnage, amount to about 50 per cent per year on the cost of the installation of the bin system, skip incline and top.

The Sheridan plant was built originally in 1874 and was remodeled and equipment added in 1891 and 1918.



Cottrell Precipitator of Furnace Gas Dust

It was, however, still handicapped by hand-filling. As the furnace was designed primarily for the production of ferromanganese, it was decided after the first year's operation that the irregularity of hand-filling did not permit of the full production that the furnace was thought capable of turning out, so when the furnace was shut down in 1919 for relining, it was decided to install mechanical filling.

The advantages of improved filling were realized without resorting to either expensive construction or an unduly prolonged period of work.

But Little Excavation Needed

The level of the existing stock house was 29 ft. above the cast house floor level, in contradistinction to the arrangement found at most plants built on valley bottoms or on lake shore frontage. These relative elevations were left exactly as found, no excavation whatever being resorted to aside from that for a shallow skip pit, and the scale car track was placed at the existing stock house floor elevation. Similarly, the relative elevations of the Philadelphia & Reading main line and stock house floor were utilized to bring the tracks onto the approach trestle and bins without either excavation or excessive fill.

The trestle approach is 240 ft. long, and in building it use was made of an abandoned trestle at the slag dump, which trestle was dismantled and re-erected, with some new timbers, thus not only saving approximately 12,000 yd. of fill but furthermore producing storage space for 20,000 tons of ore. This storage can be filled by direct dumping from cars, whereas heretofore ore had to be unloaded by crane. Recovery is easily made by means of a locomotive crane. The space has also been used in part for coke storage.

The bins are 25 ft. from scale car track rails to bin rails. Each unit is 12 ft., 6 in. long by 18 ft. wide, provided with railed walls on each side of the single track. The depth over the bin gate is 18 ft., thus giving a unit capacity per bin of 1600 cu. ft. The

Old Hoist Was Left as Service Elevator

supports are of 12 x 12 in. timber, with 2 and 4 x 12 in. side bracing and 12 in. x 12 ft. lateral bracing on the supports and bin bottom. The bins are armored with steel wearing plates at the gate discharge. Each bin has four hand-operated gates. Six ore bins and two limestone bins are provided, having a holding capacity of 725 tons of ore and 100 tons of limestone. A single coke bin, also of wood construction, is located immediately above the skip pit, chuting coke direct to the skip cars. The bin has a capacity of 9600 cu. ft., holding 140 tons of coke.

The coke from the bins to the skip cars is screened over a 42 deg. angle Haven type screen. The total area of the screening plates, which are provided with 13/16 in. holes, is 30 sq. ft. each. The coke braize that is removed from each coke chute discharges into a small auxiliary skip which is hoisted at intermittent intervals from the skip pit and emptied by means of a cable attached to the scale car. The levers controlling the bin gates are operated from a house on the opposite side of the scale car tracks. Here also are placed the bell control and indicators, the hoist engine control, and the rodding appliances.

Scale Car Operated by Alternating Current

The scale car is of particular interest, this being the first instance, so far as known, in blast furnace plant equipment where a scale car is operated by alternating current power, this having been installed to furnish power for the Cottrell precipitator. The scale car was manufactured by the Atlas Car & Mfg. Co., Cleveland, and has a single 60 cu. ft. capacity hopper, a speed of 500 ft. per min. and is driven by a 30 hp. dust-proof AC motor working through a double reduction gear. The current is supplied at 3 phase, 60 cycle, 220 volts, by a three-wire system. A spare scale car is held in reserve, a turntable being provided to alternately place one or the other in service. The spare car and the working scale car track are roofed over.

The skip incline is of the Freyn-Brassert cantilever type, at an angle of 47 deg., 45 min., and 83 ft. in length. It is supported by a 61-ft. "A" frame located 21 ft. from the center line of the furnace. The height of the bell lever platform at the top of the skip incline above the scale car track is 82 ft. The skip incline has two tracks, carrying the bail type skip cars. An Otis steam hoist is used, the hoist house being located on the stock house level, immediately adjacent to the "A" frame. Here are also located the steam-operated cylinders for working the bell levers.

Excellent access is provided to the bell and skip cable idler sheaves for inspection and lubrication. Similarly, access to the receiving hopper and to the bell lever and top sheave platform is provided by rail stairways leading both from the skip incline stairway and from the furnace top. The old vertical hoist was left to provide passenger and freight elevator service to the top of the furnace.

The furnace top is a standard Brassert type stationary double bell installation. Particular attention is paid to having a straight line dump of the skip at a fixed position behind the center line through a bell rod. This is accomplished by suitable curvature of the dumping rails. The bell levers are so mounted that either the small or big bell, or both, can be moved in any direction to keep the bell centered in the furnace. The bell levers are provided with heads designed to give a straight line drop of the bells. In the receiving hopper and throat, as well as in the gas seal and large hopper construction, are incorporated means of similarly centering, or if necessary, offsetting the location of the hopper throat, little bell seat and large bell hopper. By means of these adjustments and in conjunction with the contour of the receiving hopper and the deep throat, most excellent distribution has been maintained without any adjustments having been necessary, following the preliminary alignment determined upon when filling the furnace.

The furnace, which was erected in 1918 and was designed by the Lavino Furnace Co. to operate exclusively on ferromanganese, is 78 ft., 6 in. in height; 16 ft., 6 in., bosh diameter; 11 ft., stock line diameter; 12 ft., hearth diameter, with eight tuyeres.

The work of dismantling the old equipment and stock house started late in 1919, and the furnace was put in blast again March 15, 1920. The reconstruction was carried out under the general supervision of George F. Gering, chief engineer Lavino Furnace Co., and W. B. Corbett, field engineer for Freyn, Brassert & Co., Chicago. John J. Howard, general manager Lavino Furnace Co., planned the improvements, retaining Freyn, Brassert & Co., Chicago, as consulting and supervising engineers.

ELECTRIC CAST IRON PIPE

A Thinner and Stronger Product by Electric Treatment of Cupola of Iron

Electrically treated cast iron from the cupola has been incorporated in another commercial product on a large scale. About three years ago attention was called by a Cincinnati metallurgist to the use of superheated cupola metal in high pressure valve castings. The physical superiority of the metal as well as its greater freedom from sulphur were emphasized.

Virtually the same process or principle is now being applied to cast iron pipe by the American Cast Iron Pipe Co., Birmingham, Ala. A 6-ton Ludlum electric furnace is used which is supplied with power from the local hydroelectric company. Iron from cupolas is run into the electric furnace in comparatively small heats, which gives the company a capacity of 200 to 400 tons of electrically treated iron per 24 hr. Extracts from the company's statement regarding this product follow:

Users of cast iron pipe know the need of a light-weight product. The conviction has been established for some time that there has been too much pig iron in pipe. It is the light-weight cast iron pipe made during the early days in this country and that has been in the ground ever since that furnishes the wonderful service record we have to-day.

History of Heavy Pipe

During a period of less than a century in this country pig iron dropped from $80 per ton to $8 per ton. As the cost of iron decreased the wall thicknesses of cast iron pipe increased. In quantity production methods of recent years the resourceful skilled worker has been replaced by specialists who learn to do only one thing in connection with pipe making. High labor turnover caused higher percentage of casting losses, and the cheapest thing to do has been to put more iron into the walls of the pipe, thus increasing the factor of safety in founding. This is particularly true of the smaller sizes. As the cost of pig iron went down over these years the cost of transporting pipe also decreased, offering an additional temptation to increase the weight.

The crisis which demanded a correction of these extravagant and wasteful methods came when all the world flew to arms in the world war. A short time before the European war began pig iron suitable for pipe making sold as low as $8 per ton at Birmingham. After the reaction which followed the beginning of the war, prices began to advance rapidly and have continued to advance until the cost of pig iron is the big factor in the high cost of cast iron pipe. In the meantime freight rates also advanced, increasing the cost.

It is perfectly natural that under these conditions there should be strenuous efforts made to adapt the manufacture of cast iron pipe to the changed situation. The restrictions placed on the use of iron for cast iron pipe during the war stimulated investigation of the possibilities of reducing weight. The subsequent scarcity and increase in cost of pig iron and all materials entering into the manufacture of cast iron pipe have made it seem absolutely imperative to produce a lighter weight product.

Electric Furnace Iron

The installation of an electric furnace makes it possible to produce a uniform iron of 30,000 to 40,000 lb. per sq. in. tensile strength. Iron, which previously has been melted in the cupola, is poured into the electric furnace, where such additions are made as are necessary to bring the mixture to the required analysis and then the entire mass is superheated. This cupola iron may be mixed, before being put in the electric furnace, with certain proportions of molten iron of known analysis and direct from the blast furnace. In this method there is no addition of sulphur.

The electric treatment produces a sound casting. The chemical properties as well as the temperature are controlled to a nicety not possible by any other known method. It is not claimed that any material reductions are made in the electric furnace, but the silicon or manganese may be raised by the necessary additions of ferrosilicon or ferromanganese. A mixture sufficiently low in carbon and silicon to result in a tenacious iron can be raised in the electric furnace to a sufficient degree of temperature to make thin section castings and at the same time clean the iron of impurities.

Tests of the Electric Iron Pipe

Tests of electric iron, extending over a period of months, have demonstrated it has a tensile strength running from 30,000 to 40,000 lb. per sq. in., and a transverse strength in the standard 2-in. x 1-in. bar of 2600 to 3500 lb., with a deflection of 0.38 to 0.50 of an in. We have adopted the following as our minimum in fixing the specifications of electric cast iron pipe:

Transverse strength, 2600 lb.
Tensile strength, 30,000 lb. per sq. in.
Deflection, 0.38 in.

In tabulating the weights and pressures of this material we follow the generally accepted rules for cast iron pipe design.

The name of the Lansing Stamping & Tool Co., Lansing, Mich., has been changed to the Lansing Stamping Co.

What Will Employers Do About Wages?

Various Phases of a Highly Important Subject Vigorously Discussed—Plea for Frankness in Dealing with Employees

BY DON F. KENNEDY

ONE of the puzzling problems before employers to-day is the wage question. Shall wages be maintained at present levels, as many voices proclaim? The labor unions are not the only advocates of this answer. Editors, employers and many economists, say wages must remain where they have arrived in their pursuit of prices if justice is to be done, if widespread want is to be averted, and if industrial unrest developed in all parts of the world during the last few years is to be kept in the United States from stepping across what many think is a narrow line dividing our present conditions from the infinitely worse ones that go hand in hand with the spectre that stalks in Russia to-day, and which to us in this country seems dangerously imminent in Italy and Great Britain.

Employers are not yet certain what to do. They note many conditions which appear to have a bearing on the point; and the conditions are of such conflicting natures that the answer is not obvious. They see a lowered demand for their products, and dropping prices for those that they can sell. The taxes necessary to run our communal existence, burdened with a billion dollars a year overhead in the shape of interest on the enormous national debt, constitute a share of industry's expenses that a few years ago would have seemed unbelievable. One of the results of prohibition is that from other sources than liquor taxes, which in the past have furnished half of our internal revenue, must come this great sum. Business sees itself in the rôle of payer thereof.

More Workmen Than Jobs

Between increasing taxes and decreasing revenues from sales stand wages. To-day there are more workmen than jobs. Employers view each day hundreds of thousands of men standing outside their employment gates looking for work. They know that they can reduce wages. The temptation is great, particularly as employers have as large a share of human nature as other classes of mankind, and feel a resentment against labor as a class for the unwarranted demands that have been made during the past few years in many instances, and the admitted refusal of many workers to do a fair day's work for a good day's pay.

Certain fundamental laws, loosely covered by the term supply and demand, will eventually answer this question as it must be answered. Price levels of everything of value must fall somewhere below the peak reached six months to a year ago. Wages must perforce follow these laws with everything else, and will eventually rest at a lower level than at present. While the prices of practically all commodities have fallen more or less recently, wages have not as yet been reduced by many employers.

How Will It Be Handled?

This situation can be handled badly or well. It is within the power of employers to act wisely, judiciously, sympathetically; there is great danger to all of us if they handle it bunglingly. There are many factors entering into the subject beside the mere law of supply greater than the demand, as evidenced by the long lines of men wanting work. To ignore these other factors is to invite dangers down upon our heads.

A surprising lack of unanimity on this important subject has been shown by employers interviewed recently. Many say that it is yet too early for them to have decided on a policy. Some say they are not at present worrying about the prices they will pay for labor when they have occasion to employ men some time in the future. When that time comes, they intend to buy labor as they would any other commodity, at the lowest price possible as governed by competition. Some are afraid even to be interviewed on the subject. A few have thought ahead, have taken into account underlying principles by which their actions will be governed when they again have occasion to employ workmen, and which take into account other conditions than the lowest rates at which men may be obtained.

Two Parts of the Problem

The problem resolves itself into two parts; shall wages be reduced, and if so, how much and by what methods shall it be done? There is a very simple guide by which it may be solved satisfactorily. The sum and substance of it is, "Give the workman credit for being intelligent."

The man in the shop knows what is going on just about as soon as the man who sits at the general manager's desk. He knows better than the employer many everyday conditions that affect the problem. The readers of this article are largely employers; yet how many of these readers know what the butcher charged for the steak they had for dinner last night, of the sack of flour from which the biscuits were made? The workman knows, for the cost of food is a large part of his budget, while it is a small part of the expenditures of the man who lives on a large salary or on dividends from invested money.

The workman knows what industries are selling their goods and what ones are not. He sees finished stock piling up on the floors of the factory in which he works, and in its warehouses and shipping rooms. He knows that he cannot expect to go on piling up finished parts indefinitely. He is looking for curtailment, and while it is going to be a serious blow to him when the cut or layoff comes, it is not going to be unexpected.

When Prices Advanced

When prices of everything the workman had to buy started rising, he paid them for a while, and then came to his employer for more pay. You, Mr. Employer, gave it to him. True, as it always is, his pay increase was always behind the increase in the prices of those articles which constitute his cost of existence. By the same token his decrease should come after living costs are lowered. But at any rate he came to the office and stated his case frankly. If in the near future a wage decrease is necessary, call your men together and tell them so! You will have their confidence, and you will get their co-operation. But if industry undertakes to do what some companies are reputed to be doing—the practice of wage cutting by various underhanded methods—then employers will not fool their men, and they will store up endless trouble for themselves and for the country. One hears persistent reports that shops are shut down with the explanation that orders have been canceled when, as a matter of fact, they have not, with the expectation of reopening in a few weeks and rehiring their same employees, or others, at reduced wages. It is unfortunate that there are employers who think such transparent methods will not be seen through by their workmen.

Others are reported to be running full blast till as much finished stock can be completed as can be financed, or carried in their own and their dealers' warehouses, planning to shut down tight at that time on the theory that the product can be manufactured more cheaply under full production than by running shorter hours or fewer days a week. The fact that such policy works

great hardships on their employees is given no consideration in their calculations.

Definite Duty Exists

Such management is fortunately much less in evidence than it was a decade ago. Present day business figures that it has a definite duty toward the families who have gathered their belongings and hopes and aspirations about the plants at which the head is employed, and that a reciprocal obligation is theirs to take heed of the family to whose labor they owe their prosperity and existence.

There are those who are heard to say that the workman was blind who could not see ahead what was coming, and lay up a savings account to tide over such periods. They assume to give the workman more intelligence than many a corporation which invested its high profits of the past few years in factory extensions and new machinery to pyramid these profits, and which now finds itself possessed of an enormous plant and corresponding overhead charges, but with no working capital with which to finance it. A certain man whom many of us know by hearsay, but fewer by actual acquaintance, one Adam Smith, pointed out 150 years ago a fundamental truth that is overlooked in such discussions; that a workman by the very nature of things is a man without the means to support himself over any lengthy period. When the more intelligent or more diligent workman has succeeded after some years of toil in laying up a sum of money he sets up in a small business of his own with his accumulated wealth, and behold! he is no longer a workman, but an employer, even though he may employ at first only one or two men.

But in figuring whether or when wages should be decreased, several items require consideration. The head of a large automobile company said recently that he had taken some pains to find out the results of the requests of his purchasing department to its sources of supply for reduced prices to compensate for the reduction in the price of his car forced on him by the refusal of the public to buy at the old figures. He said that one of two answers was invariably given. Either the reduction was granted, or the plea was made that materials remained as high as ever, wages remained the same, and consequently no concession could possibly be made. Never was a word said about a reduction of profits! This alternative never seemed to have entered their minds. This man said that they themselves had taken a large cut out of the profit part of the selling price of the car when reduced prices were decided on.

An Interesting Experience

Two women in a mid-western city this fall had occasion to have their fur coats repaired and remodelled. The coats were nearly identical, and the work required was about the same. One took hers to the leading fur store of the city and left it there. The other hunted up a smaller shop on one of the less important streets some little distance out. Her coat was done first, and it so happened that they both went together when the coat was ready. While in this shop the first woman saw a coat hanging up which looked so much like her own that she examined it closely, and to her surprise found that it was her own that had been sent to this place to have the actual work done. Comparing prices, she found that she was paying the large store, which was filling the newspapers full of advertisements of furs and work at enormous reductions, a clear profit of $400 for handling the transaction! A large department store in this same city last week experienced the poorest day's business in the history of the institution. The manager was severely taking to task the saleswomen for not selling more goods. He said that prices had been reduced on everything, and that the girls should make more sales. The head saleswoman of one department replied, "The people will not buy, and we cannot make them. After the exorbitant profits you have been making in this department for the past three years you should be content to operate at cost or a little less for a time."

In deciding where reduced cost of operation should begin, profits ought to be the first item scanned. In considering the item of wages, it should be kept in mind that the chief components of the cost of existence of the ordinary person are still nearly at the top. Retail prices of the daily necessities have not yet been forced much below their highest levels. Taking advantage of the country-wide shortage of houses, rents have been criminally increased. Jumps of $10 and $20 and $40 a month have been made time and time again—with no alternative but to pay. Rents have not been reduced. The householder who listened to the advice of his Chamber of Commerce and others to whom he would naturally listen for counsel filled his cellar with coal for the winter, and now finds that he paid peak prices. This important part of his budget is settled for him for this year. Retail prices of food have dropped less than 3 per cent. Much noise is being made in the public prints of reductions of a cent or two in bread, but this means but 10 or 15 cents a week to the average family. Clothing has dropped greatly, but in times like these workmen out of a job or working part time are not buying new clothes.

In brief, the cost of existence of the laboring man is still at its highest point to all practical purposes. When retail living costs, of which the major items are rent, food, heat, light and clothing, come down, then it will be in order to reduce wages accordingly. When such action does become necessary, go to the workman frankly and honestly, and he will receive you in the same spirit.

New York Industrial Counselors

Feeling that public opinion is the final arbitrator in matters of industrial disputes, and as such, should receive honest and unprejudiced judgment not only in industrial conflicts, but on all matters in the industrial relations field, the New York Industrial Commission has recently created the position of industrial counselors on its staff. The work of the counselors is divided into three phases:

First, information: Material and the result of experience on questions entering into industrial relations is collected, filed and maintained for references.

Second, distribution: Such information is then disseminated through special bulletins, correspondence, memoranda, and personal consultations. A short memorandum on the development of safety organization and educational work during the last two years is now in preparation and will be ready shortly.

Third, inquiry and research: Special inquiries and labor audits are carried on for plants and special groups. Several such investigations have already been made, including the establishment of a plant sickness insurance fund, a training school for first aid, shop safety organization for plants having less than 250 employees and community personnel administration for small industrial units.

J. B. Buell, a graduate of Oberlin College and Columbia University, formerly on the staff of the division of industrial studies of the Russell Sage Foundation, and Charles M. Mills, a graduate of Amherst College and Columbia University, formerly engaged in industrial research and engineering work in Idaho, Oklahoma, Kansas, Missouri and Massachusetts, and more recently on the staff of the Scovell Wellington Co., industrial engineer, Boston, have been appointed as counselors. They are attached to the New York office of the bureau of mediation and arbitration. The commission believes that through such scientific approach to industrial problems, a more stable industrial equilibrium can be maintained.

The Barde Industrial Co., Seattle, Wash., has purchased the structural steel stocks of the Vulcan Mfg. Co., also of Seattle, and the latter company will retire from the structural steel trade. The Barde Industrial Co. will dispose of the material in the open market. This concern has its headquarters at the former shipyard plant of the Skinner & Eddy Co., and some time ago bought the surplus steel stocks on the Pacific Coast of the United States Shipping Board at the reported price of close to $15,000,000.

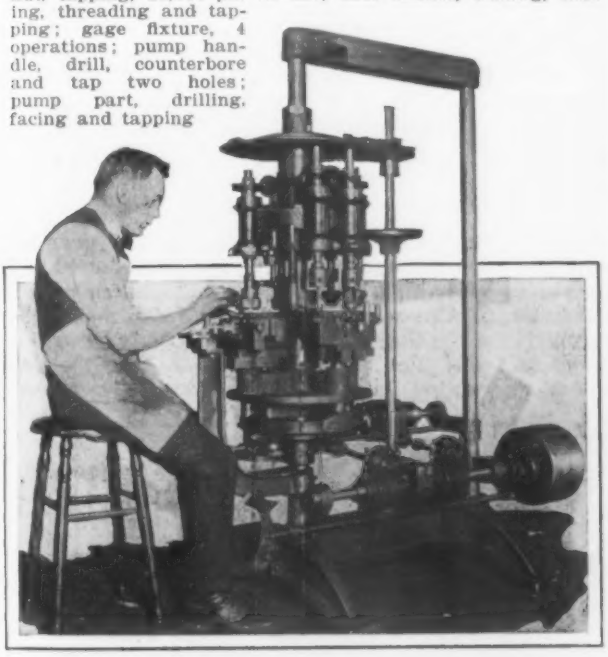
Vertical Automatic Chucking Machine

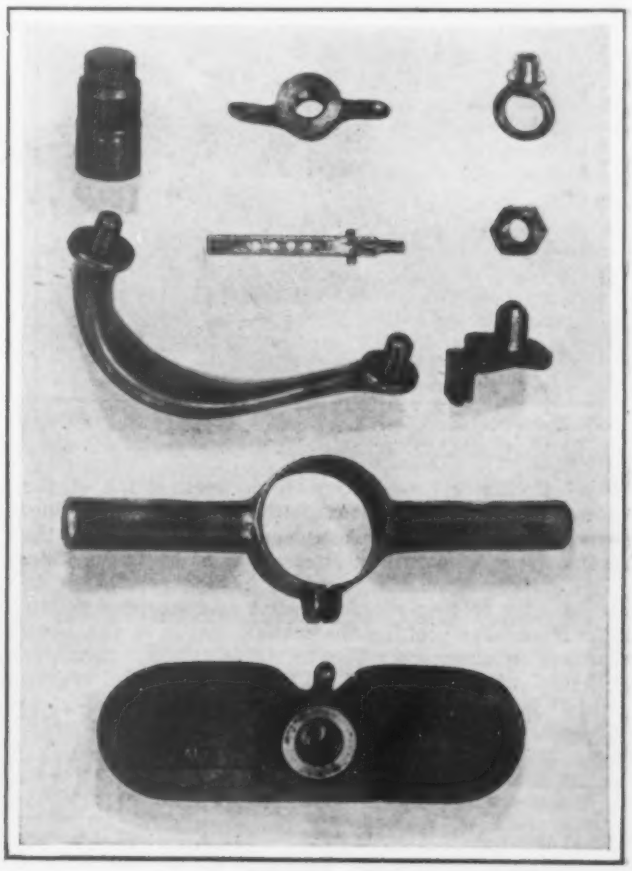
Rapid production is a feature of the Jackson vertical automatic chucking machine manufactured in three types and sizes by the Long-Henkel Mfg. Co., Reading, Pa. The accompanying illustration shows the reciprocating type, known as type B. This size is being made with four duplex automatic chucking vises and three pairs of working spindles and is mainly adapted to the class of work requiring turning to size, drilling or boring and threading or tapping.

The chucking vises automatically eject the finished article and after the operator puts the unfinished article in place the vises again close automatically. The machine has a positive drive throughout and is equipped with ball bearings. Handy and quick acting tool adjustments are provided making the machine easy to set up. A commendable feature is that the work is constantly in full view of the operator, providing a safeguard against mischucking and other accidents.

In many cases multiple operations can be performed upon the same setting, such as drilling different sized holes, tapping within different sized taps, and various other operations limited only by the number of spindles that may be used. As a threading or tapping machine for standard bolts or nuts a magazine feeding appliance may be used.

Jackson Type B Vertical Automatic Chucking Machine. Samples of work are shown at the right; from left to right, these, with production rates are: Pump nipple, turning, threading and drilling, 5000 per 10 hr., turning, facing and threading, 5000 per 10 hr.; spiral wing nut, drilling, facing and tapping, 5000 per 10 hr.; electric fixture, 4 operations, 8000 per 10 hr.; lock bar, drilling and tapping; standard nut, tapping, 20,000 per 10 hr.; door handle, turning, drilling, threading and tapping; gage fixture, 4 operations; pump handle, drill, counterbore and tap two holes; pump part, drilling, facing and tapping





New Canadian Steel Company Incorporated

The establishment of a large iron and steel industry in British Columbia backed by British capital was announced in a recent issue of THE IRON AGE. A late issue of the British Columbia *Gazette* carried a notice of the formation of the Coast Range Steel, Ltd., Vancouver, B. C., with a capital stock of $15,000,000. The promoters claim that within the next few years about $50,000,000 will be spent on the establishment of a great steel industry to be located on the lower mainland of British Columbia. Already five Vancouver men have been named as provisional directors, and it is further stated that construction work on the plant will be started within six months. Three years ago, the British Columbia Government offered a bounty of $3 per ton on pig iron produced in the province from native ore. After investigating the interests behind the Coast Range Steel Co., the British Columbia Government passed an order-in-Council sanctioning an agreement between the Minister of Mines and the company. British engineers have been investigating the adequacy of raw material resources and they have made a favorable recommendation to their principals. The time estimated to complete the proposed plant will be three years, during which time $15,000,000 will be spent, so the industry cannot avail itself of the Provincial bounty on pig iron until the end of that time. Meanwhile preliminary work is being pushed. The site for the plant has not yet been definitely settled, according to men interested in the project, but the lower mainland appears to be the likely location for the plant.

Lake Superior Ore Shipments in November

Iron ore shipments from the Lake Superior region in November were 5,305,738 gross tons, as compared with 3,152,319 tons in November, 1919. This is an increase of 2,153,419 tons, or 68.31 per cent. The season's shipments to Dec. 1, this year, have been 58,428,080 tons, as against 31,130,733 tons to Dec. 1, 1919, an increase of 11,297,347 tons, or 23.97 per cent. The following table gives the November and season shipments by ports and the corresponding figures for 1919 in gross tons:

	November, 1919	November, 1920	To Dec. 1, 1919	To Dec. 1, 1920
Escanaba	483,046	791,130	4,936,968	7,305,457
Marquette	251,149	298,011	2,132,935	3,415,108
Ashland	527,176	726,985	5,915,383	8,174,182
Superior	615,903	1,240,661	10,899,693	14,812,398
Duluth	875,584	1,390,003	16,821,209	15,479,334
Two Harbors	399,461	858,948	6,424,545	9,241,601
Total	3,152,319	5,305,738	31,130,733	58,428,080
Increase		2,153,419		11,297,347

The Duluth percentage this year to Dec. 1 of 26.49 per cent is considerably less than a year ago, when it was 35.69 per cent of the total. The Great Northern dock at Superior is credited this year with 21.71 per cent of the total, against 19.30 per cent a year ago.

The White Mfg. Co., Goshen, Ind., has been incorporated and has purchased the shop and business of the Alford Motor & Machine Co. and the Goshen Motor Works. A general manufacturing business will be conducted.

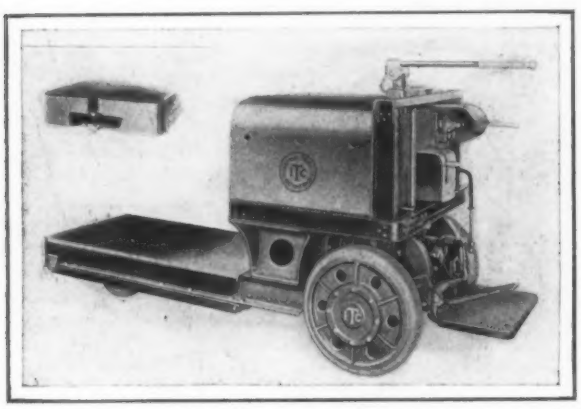
Self-Loading Electric Truck

The industrial self-loading truck shown in the accompanying illustration has recently been placed on the market by the Industrial Truck Co., division of the Cowan Truck Co., Holyoke, Mass. It is all-steel and of 5000-lb. capacity.

A quick acting elevating mechanism is emphasized as a feature. It elevates in 5 sec. when equipped with 28 cells and in 6 sec. with 21 cells. The lifting mechanism is operated by an independent, heavy duty, series wound motor and worm gear reduction. The platform lifts vertically, the rise being 4½ in. It may be stopped at any point going up or down, and 3 sec. suffices for full lowering.

The rear end is equipped with a heavy bumper which takes shocks and protects the rear end of the lift platform. The rear end is also equipped with a draw-bar attachment which enables the truck to be used as a light duty tractor.

Automatic brake and circuit breaker application,



This Industrial Self-Loading Truck Elevates in 5 or 6 Sec. and Lowers in 3 Sec.

four-wheel steer, single reduction worm drive of the power axle and ready accessibility of batteries, lifting, driving and control mechanism are features of the truck. It will operate in intersecting aisles 60 in. wide.

The turning radius, extreme outside point, is 7 ft. 10 in. By folding the foot pedal and steering handle into a vertical position the overall length is shortened for use on elevators. The length is 102 in. overall or 91½ in. with step raised. The width is 36 in. overall and 51 in. high over steering shaft head. Either alkaline or lead batteries are used. The controller is of the drum type, with three speeds forward and three reverse.

Study of Low Grade Ores

WASHINGTON, Dec. 7.—Interest of the steel industry in the annual report of Frederick G. Cottrell of the Bureau of Mines centers in the progress made at the Minneapolis Experiment Station in the study of low-grade iron ores. This work has been done under the direction of D. A. Lyon, chief metallurgist.

"The United States," says the report, "has extensive deposits of low-grade iron ores that cannot be smelted profitably under present methods. If these low-grade ores could be utilized the iron reserves of the country would be enormously increased, but in order to obtain the iron, enough of the gangue and impurities in the ore must be removed to raise the iron content to the percentage required for profitable smelting, or else methods of smelting ore of lower iron content must be devised.

"The bureau's work on iron is centered at the Minneapolis station, and is being conducted in co-operation with the School of Mines, University of Minnesota, and with the State mining experiment station.

"The State experiment station and the mining companies have done and are doing much work on the development of methods for concentrating and washing low-grade minable ores, and for eliminating objectionable impurities, such as phosphorus and sulphur, to bring the ore up to commercial grade. The Minneapolis station is co-operating with the State mining experiment station in beneficiation tests of samples of low-grade iron ores, collected from dumps and stock piles by mining engineers of the station in their study on mining equipment and concentration methods employed by the iron ranges.

"The Bureau of Mines, however, is paying attention rather to the second phase of the problem, namely the devising of practical methods for reducing ore which is considered too low-grade for blast-furnace smelting in present practice.

"During the year an experiment blast-furnace was erected at the Minneapolis station, and tests are under way on possible methods of smelting low-grade manganese ores. This work has the further object of obtaining a comprehensive record of furnace data, and will be extended to include a general study of the operation of iron blast furnaces.

"An investigation of the methods for determining phosphorus in iron ore was made at the Minneapolis station and a report prepared on the subject. Experimental work to determine the feasibility of removal of phosphorus from iron ores by leaching showed that the method is not commercially practicable.

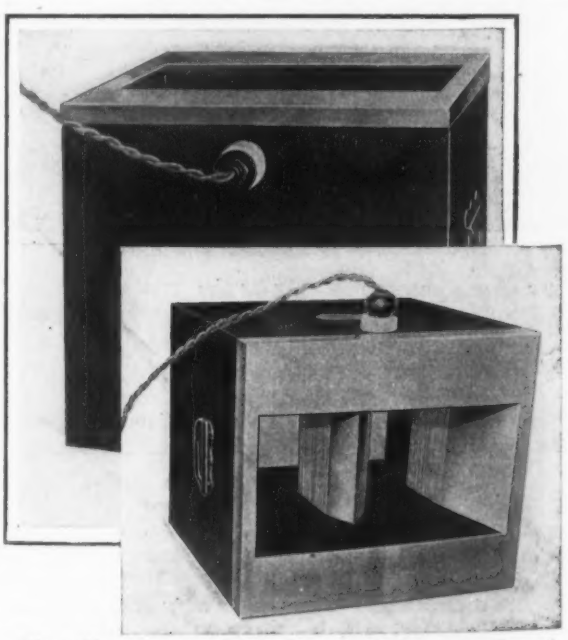
"The Minneapolis station, preparatory to a study of heat treatment of drill steels, is collecting samples and making preliminary metallographic tests.

"Work at the Berkeley, Cal., station on an investigation of methods of producing sponge iron continued throughout the year.

"The Golden, Col., station, in co-operation with the Primos Chemical Co., Primrose, Pa., and with the Colorado School of Mines, is studying the preparation, properties and uses of molybdenum steels with the object of arriving at the best conditions under which duplication of steels of definite composition can be obtained. The work is under the direction of R. Keeney, of the Colorado School of Mines."

Quantity Work Demagnetizer

An apparatus for demagnetizing work in quantity and known as Demagnetool No. 2, is manufactured and marketed by William Brewster Co., 30 Church Street, New York. The work may be poured or dropped through the opening at the top and quickly demagnetized to zero. The tool is designed so that the flux flows in straight lines, thereby making the orifices



Work May Be Dropped or Poured Through the Top of This Apparatus and Quickly Demagnitized to Zero

through which the work passes equally operative at any point in the orifice, thus to make it impossible for work to pass through and not come in contact with the stray field. In addition to the No. 2 Demagnetool, which has an opening of 6 x 12 in., the company is prepared to manufacture these tools in other sizes that may be required. The transformer used is of special design.

Predicts Passing of Pittsburgh Basing Plan

General Counsel Lindabury Says That Rapid Growth of Steel Production in Chicago Will Change Business Custom —Hearing Before Federal Trade Commission Continues

WASHINGTON, Dec. 7.—R. V. Lindabury, general counsel for the United States Steel Corporation, told the Federal Trade commission yesterday that the present rate of growth of steel production in the Chicago district would wipe out the "Pittsburgh base" system of steel prices within five years, by the operation of economic laws. It was the concluding point of his argument against a reopening of the proceedings before the commission, and part of the three days of argument which the steel producers are presenting to the committee in opposition to the plea for the issuance of a complaint against them, made by the Western Association of Rolled Steel Consumers and other fabricators. They failed in their first attempt to obtain such a complaint but later were given a new hearing by the commission. Their arguments were heard three weeks ago, and at the conclusion of to-morrow's argument they are to have a final three hours for rebuttal. The case will then rest in the hands of the commission. Should the latter reverse its former finding and determine to issue the complaint, there will still be another year of investigation and hearings before a decision can be made and then a year or so of litigation in the courts before the commission's final decision can be put into effect.

The Opposing Attorneys

Mr. Lindabury's argument consumed all of yesterday's hearing. Attorney Henry R. Platt for the Inland Steel Co. continued the argument to-day, giving the position of the independent steel producers who are aligned with the Steel Corporation in this contest. Attorney James Francis Burke spoke for the Pittsburgh Chamber of Commerce, which also is opposing the efforts of the Western and Southern fabricators to obtain the abolition of the "Pittsburgh Base"—or "Pittsburgh Plus" system as they have termed it—by a decree of the Federal Trade Commission. Paul D. Cravath, attorney for the Bethlehem Steel Co., presented the view of Eastern independents, while L. A. Manchester of the Youngstown Sheet & Tube Co., Frank H. Scott, of the Steel & Tube Co. of America and C. W. Wickersham, for the Lackawanna Steel Co., also were scheduled to oppose the issuance of a complaint. It was expected that the rebuttal on Thursday would be in the hands of H. G. Pickering, as the chief counsel of the Western Association, and Elliott Cheatham, attorney for the Southern complainants.

Since the hearing three weeks ago, Victor Murdock had retired from the presidency of the commission and Huston Thompson sat in his place at the head of the table. Commissioner Murdock, however, continued to take an active part in the proceedings, as did Commissioners Gaskill and Pollard, the fifth seat at the commission table still being vacant. None of their questions, however, indicated whether any of them had changed their views since Commissioners Murdock and Gaskill voted against the issuance of a complaint and Commissioners Thompson and Pollard favored its issue.

Question of Jurisdiction

Attorney Lindabury renewed his contention that the Federal Trade Commission could not take jurisdiction in the case unless it was convinced that the Pittsburgh base price was either the result of an agreement in restraint of competition covered by the Clayton act, or an act of unfair competition under the Federal Trade Commission law.

"If you assume," he said, "all that the complainants claim with regard to this proceeding, if you assume that it is so uneconomical that you are forced to believe that it is the result of an agreement and that the condition complained of exists under an agreement—which it does not—you can not control it unless it is the product of unfair trading. It may offend against every other law in the United States, but unless it is accompanied by 'unfair methods of competition,' you have no jurisdiction.

"They ask you to assume that there is a combination of steel producers, and that the prices are the result of a conspiracy between the producers. Mr. Pickering said that there is no competition at all and that there has been none since 1904; that there has been an understanding between the steel manufacturers which resulted not only in the Pittsburgh base system but in a fixation of steel prices in all markets of the country. If such a condition actually existed, they have no right to be here. They should be at the Department of Justice. It is a case for the Department of Justice and not for this commission, because you can't possibly call the establishment of such a result, 'an unfair method of competition.' It is just the reverse. It is a suppression of competition."

Quotes from "The Iron Age"

Mr. Lindabury then took up the contention that the Pittsburgh base system began with the founding of the Steel Corporation. This he sought to refute by quotations from THE IRON AGE of the year 1892, to show that "Pittsburgh base" prices were quoted in that year. He read to the commission four citations from THE IRON AGE of that year, and followed it with a series of similar quotations for other years. The 1892 citations follow:

Feb. 11, 1892—*Chicago.* Steel billets are said to have declined considerably in Pittsburgh. If this is true, an important prop to the maintenance of their values has given way. On 20-in. beams 2.50c. Pittsburgh is quoted.

May 19, 1892—*Philadelphia.* Quotations (for steel billets) made today for May deliveries are for $24.60 Philadelphia, and $24.90 for later dates. Freights from Pittsburgh are down to $2 for the current months, but after June 1 they are to be advanced to $2.30, hence the difference in quotations between May and June.

May 26, 1892—*Philadelphia.* Steel billets are still weak with sales reported in Eastern Pennsylvania at equivalent to $22, Pittsburgh.

June 9, 1892—*Chicago.* Billets and rods. Makers are holding firm on these articles. The demand is limited to a few consumers who generally purchase their supply from Western producers at figures based on Pittsburgh prices, freight added.

Result of Economic Law

Then Attorney Lindabury repeated the contention that the Pittsburgh base system was the result of an economic law, due to the fact that there was a deficiency of steel production in the Chicago district to supply the demand and a surplus in the Pittsburgh district, so that the latter price prevailed.

"It was the operation of that law which induced the Steel Corporation in 1908 to build the Gary plant, for it was able to make from $6 to $7 a ton additional profit on the steel produced there. The same motive prompted the establishment there of the plants of the Inland Steel Co., the Interstate Steel Co., and the Steel & Tube Co. of America. But in those years not a single new plant has been built at Pittsburgh."

To prove the relative deficiency of Chicago's steel production and the excess in Pittsburgh, Mr. Lindabury introduced the accompanying table to show shipments

of finished products from Steel Corporation mills to the Chicago district and the shipments from Chicago mills to the Pittsburgh district.

Shipment to Eastern Points

To explain the shipment of 7 per cent of the Chicago production to Eastern points, Mr. Lindabury declared that these were distributed to:

Consumers of electrical steel, principally manufacturers of automobile parts.

Consumers who have plants also in the Chicago districts whose orders are made up to one company, as a whole, and which it is desirable to execute likewise.

Consumers who require special rolled shapes for special purposes and for which there is a limited market, such as rolled shapes of special form and dimension for vehicles, railroads and street cars and metal sash, and which can be rolled, practically and economically, only when sufficient tonnage is accumulated.

Mr. Lindabury also devoted himself at length to a series of tables of steel production and capacity in Chicago and Pittsburgh, presented by the complainants, and declared that the latter had made comparisons between production and capacity in different years to prove their contention that Chicago's production had been kept down to 40 per cent of its capacity in the efforts of the Steel Corporation to maintain Pittsburgh's supremacy. He insisted that hundreds of millions of dollars had been needlessly put into new plants in the Chicago district by the Steel Corporation as well as the independents, if they did not intend to use them, and then pointed out figures in the complainants' tables which indicated a production as high as 90 per cent in the Chicago district instead of the 40 per cent of capacity claimed by the complainants.

The representative of the Steel Corporation also put into the record long excerpts from the decisions of the United States Supreme and District courts in the dissolution proceedings, with a claim that these demonstrated that the Corporation did not control prices. He declared that these views were binding on the commission in the present case.

"The ultimate question before this commission," declared Mr. Lindabury, "is whether a combination has existed which accounts for these prices. The question is, 'Have these prices been fixed by agreement?' That is what all this leads up to. And on that point, on which you are now asked to reconsider your own decision, you are asked to reverse the decision of the Supreme Court reached after four years of litigation. They have no right to ask you to make that investigation again, or to reopen a case that was conducted by two Attorneys-General of the United States in the most voluminous proceeding ever held in the courts in which it was tried."

A question by Commissioner Murdock brought out Mr. Lindabury's belief that the Pittsburgh base system would disappear by operation of economic laws.

Pittsburgh Basing Doomed

"We have been for a long time on a rising market in which the demand exceeded the supply," declared the commissioner. "Evidently that period is gone. In your opinion, if there comes a time when there is an excess of production everywhere and a diminution of demand, what will be the effect on the steel prices charged? Will they be on a Pittsburgh base?"

"Personally," replied Mr. Lindabury, "I believe the Pittsburgh base price won't last a week under such conditions. The Pittsburgh base will not last five years, anyhow, if it is let alone. I haven't any doubt that with this increase in production at Chicago the law of supply and demand, which is inexorable, will change the whole situation. It has been delayed so far by an inordinate growth in consumption in the Chicago district. Of course, if you can continue to increase the demand in the Chicago district, you can retard the day when the supply overtakes it."

"If a Pittsburgh basing point is a good thing in rolled steel products," again asked Commissioner Murdock, "why not in other items, such as foundry castings?"

"That question rather assumes that these basing points are the results of agreements," replied the lawyer, "that men get together and agree upon them. That is just what we contend they do not do. Pittsburgh base is the result of the condition that arose from the fact that at one time there was no steel mill outside of Pittsburgh. Then they built one at Cleveland, and that mill could charge the Pittsburgh price plus freight to the consumer in its territory. It was not a matter of agreement, but of growth. Take the situation in pig iron. There has never been any Pittsburgh base in pig iron for the simple reason that Pittsburgh has never dominated the production of pig iron. There is no place in the United States that has ever been able to dominate the production of pig iron."

Mr. Lindabury also introduced a series of tables to show that all the production of the Birmingham district has always been consumed either within that district or sold for export.

Shipments to and from Chicago District

Year	Shipments into Chicago District: From mills in Pittsburgh district (A) Tons	Per cent	From mills in Chicago district (B) Tons	Per cent	Totals from all mills into Chicago district	Shipments from mills in Chicago district to points in Pittsburgh district Tons	Per cent
1915	1,134,062	47.6	1,247,795	52.4	2,381,857	187,833	7.9
1916	1,450,833	44.2	1,830,325	55.8	3,281,158	239,793	7.3
1917	1,593,040	45.1	1,936,361	54.9	3,529,401	262,180	7.4
1918	1,576,370	46.1	1,845,257	53.9	3,421,627	220,165	6.4
1919	1,491,254	51.3	1,413,459	48.7	2,904,713	210,574	7.3
Total 5 years.	7,245,559	46.7	8,273,197	53.3	15,518,756	1,120,545	7.2

(A) Pittsburgh district for the purpose of this statement includes all territory East of Illinois, but excluding that portion of Indiana embraced within the Chicago metroploitan district.

(B) Chicago district includes all territory West of Indiana and including that portion of Indiana embraced within the Chicago metropolitan district.

Mr. Burke's Argument

"In this proceeding the Pittsburgh Chamber of Commerce," said Attorney Burke for that organization, "represents in the broadest and truest sense the interests of the public, inasmuch as it includes in its membership a larger number of manufacturing establishments immediately and vitally affected than any other commercial body in America, and because it reflects the views of the business world generally in all matters involving the relationship between business and government in this country.

"We are confronted here by a larger and broader question than one affecting a few corporations directly engaged in a race for trade. Its solution involves consequences far more significant and vital than the immediate success or failure of any number of manufacturers engaged in a single line of commercial activity.

"To apply the remedy which the complainants selfishly invoke would paralyze thousands of industries already established and discourage, if not render impossible, the future development of manufacturing and other competing establishments in American commerce. It would dampen the ardor of industrial initiative, it would put a blight upon the aspirations of every undeveloped community, it would discourage every

dollar embarking upon a new enterprise, or seeking investment in a new field where it hoped to reap the rewards of courage and profit by the lack of competition.

"Never was it more essential that this commission preserve the confidence of the nation by strictly observing the legal limitations attached to its powers than at this time when the business world is on the verge of psychological panic, and never was a more wholesome opportunity presented for it to declare with emphasis that it is opposed to the policy of self-enlargement of its authority and the consequent increased encroachment upon private rights such as, in recent years, has invited the criticism of too much government in business and too little business in government.

"No matter how this commission may, by arbitrary ruling, readjust local conditions or give to one set of individuals an advantage over others, by diverting commerce from its natural channels, it cannot violate fundamental principles of trade and avert the natural consequences of ignoring the well-established law of commercial intercourse; it cannot substitute an artificial basis of business such as the complainants here seek, without imperiling the whole commercial structure upon which both labor and capital depend in their struggle for local, national and international existence and success."

New Process for Locating Mineral Deposits

The Divining Rod Made Efficient by a German Invention—Remarkable Results—Prospecting Revolutionized

BY HERMAN A. HOLZ

WONDERFUL progress has been made in Europe, during the past four years, in the utilization of atomic forces about which theory still knows very little.

Processes and practical means have been developed to a high state of perfection for definitely locating mineral deposits—solid, liquid, and gaseous—in the earth, from above ground; for accurately determining the position, depth, width, thickness of each such deposit, and for differentiating between the various materials forming the deposit.

The invention has been developed by an engineer of high standing, for many years chief engineer of a prominent boring and drilling company. I had occasion, during the past summer, to investigate and study the invention, the technique of its application and the infallible success with which it is used by the inventor and his engineering staff. I went to great pains to have the indications of the apparatus carefully checked, and located myself an extensive lead-zinc-silver field right near the American occupied territory. I made especially sure that the apparatus repeats its indications, in laboratory and field work, when applied by the inventor, his engineering assistants and by other persons.

We have made the mistake, in this country, in considering the "divining rod" a joke. Not so in Europe. Only a few months ago, the French Academy of Sciences, consisting of France's greatest scientists, decided upon a careful investigation of the divining rod and of the forces which actuate it. The Encyclopaedia Britannica, compiled by prominent scientists, says regarding the divining rod and its application "in any case, modern science approaches the problem as one concerning which the facts have to be accepted and explained by some natural, though obscure, cause. It is this obscure cause which has been discovered in Germany and which is being successfully utilized."

All materials of mineral origin seem to give off certain emanations, different for each element. I presume that the difference lies in the speed of electrons given off and has certain relation to the atomic weight of the elements. These variations, carefully studied by the inventor, permit him to differentiate clearly between the various materials forming a deposit, by synchronization of the apparatus to the waves of different form. Thus, if the apparatus is adjusted for lead, it is actuated only by lead; if set for oil, it is acted upon only by oil. The apparatus can be adjusted for practically all useful materials found in the earth, such as all ores, salts (potash, etc.), coal, sulphur, asbestos, oil, natural gas, various clays, precious stones (diamonds, etc.), mineral water, spring water, etc.

There are several very remarkable features of this process. They are remarkable only, of course, because we know so very little about the atomic forces utilized.

First, of all, the emanations or rays penetrate everything except pure metallic lead. This proves their similarity to X-rays and to the radiations given off by radium.

Second, the emanations are given off by the materials at definite and carefully determined, different angles. These known angles are utilized in the practical application of the process for determining the depth and exact location of the deposit.

Third, some of the rays are perceptible at a distance of 50 miles from the deposit, indicating its presence and general direction already from such a large distance, thus adding greatly to the practical value of the process in field work.

Fourth, there is no personal element entering into the use of the apparatus; it works equally well and correctly with everybody and repeats its indications exactly at the same spots, thus proving in the most reliable manner the presence of certain forces in definite directions.

The strength of the atomic forces which act on the apparatus is often surprisingly large. We seem to possess not the slightest idea of the magnitude of some of the forces which are present on earth and which have not yet been explored in this country. I feel certain that systematic research work along these lines would clear up some of the great mysteries with which we are still confronted—the mysteries of electricity, of magnetism, of life.

I have reasons to believe that the divining rod, used for over a thousand years, and in some cases undoubtedly with success, is acted upon by a few of the rays which are utilized completely and systematically in the highly developed apparatus outlined above.

It is hardly necessary to dwell upon the tremendous economic value of this invention; it is bound to revolutionize mining methods. It will reduce the speculative element in mining and drilling operations to a minimum; it will render great help to geologists in valuation reports, in laying out extensions to shafts, in relocating ore veins which have shifted in the earth, and in profitable exploration of mineral fields consisting of discontinuous ore bodies. It will increase efficiency in mining all around. There is no more need of "wild cat" drilling for oil; the indications of the process are accurate to a depth of 7000 ft.

This invention makes it possible to survey the entire country for useful minerals. In some of the European countries such an undertaking is already under consideration.

Combustion engineers are hereafter to be admitted to membership in the Association of Iron and Steel Electrical Engineers. B. W. Gilson, Carnegie Steel Co., Youngstown, Ohio, is president, and J. F. Kelly, 513 Empire Building, Pittsburgh, is secretary and manager of the association.

The Chicago Machine Tool Dealers' Association will give a dinner at the Machinery Club of Chicago on Dec. 10. J. W. Thomas, vice-president Great Lakes Trust Co., Chicago, will give an analysis of the causes of the present business conditions and their bearing on the future.

Better Production by Standardization

Greater Efficiency, Even and Full Output and Infrequent Unemployment Periods Thereby Possible, Say Members of Taylor Society

THE range of topics covered and the enthusiasm and spontaneity of the large number of speakers at its six public meetings distinguished the annual convention of the Taylor Society held Dec. 2, 3 and 4 in the Engineering Societies Building, New York. Of these meetings that on "The Long Day in the Steel Industry" held jointly on Friday evening with the metropolitan and management sections of the American Society of Mechanical Engineers and the New York section of the American Institute of Electrical Engineers created the greatest stir. Interest, however, in all the meetings was well sustained and especially in the standardization of products sessions. Saturday forenoon and afternoon, important information was brought to light.

Scientific Management in Selling

Henry S. Dennison, president of the Taylor Society presided at the morning session, Friday, Dec. 3, at which the results were given of a questionnaire on sales operation, particularly with reference to the coordination of selling and production. The report was read by the chairman of the committee, Willard E. Freeland, sales engineer, Winchester Repeating Arms Co., New Haven, Conn. A report by a committee on the organization and functions of the sales engineering department, also read by Mr. Freeland as chairman, stated that the conditions or causes which have led to the establishment of engineering and operating as separate major functions in the manufacturing departments exist also with respect to distribution and indicate the necessity for the recognition of engineering and operation as major functions in the production of sales. The report referred to master planning and scheduling as sales engineering. Field research and technical assistance also come under its scope, it was stated.

A third report by a committee on the organization and functions of the sales operating department was read by Dr. H. S. Person, managing director of the Taylor Society. The two divisions of selling, sales engineering and the actual conduct of selling operations, were briefly described. A comparison between a sales department and a production department was also given.

The entire Friday afternoon session was devoted to a discussion of the reports read at the morning meeting. The consensus of opinion seemed to be that reports by salesmen are likely to be biased and that information from the field can best be supplied by trained investigators. The extent to which money or time should be expended for obtaining worthwhile facts was included in this comment.

Standardization of Products

The Saturday morning topic was standardization of products from a national, trade and plant point of view, while the afternoon again was devoted to a discussion of the topic of the forenoon. Lack of standardization, it was repeatedly pointed out, frequently arose from demands by the sales department to burden the production department with new styles and varieties unlike those supplied by competitors. Abstracts of the papers read at the morning session are as follows:

Melvin T. Copeland, director of the Bureau of Business Research, Harvard University, and secretary of the conservation division, War Industries Board, 1917-18, told of his experiences on the War Industries Board in his paper on "Standardization of Products as a National Economy." When the armistice was signed in 1918, he said, conservation programs for 269 industries had been prepared. To put these programs into effect, of course, standardization was frequently necessary.

Effort was directed especially to (1) reduction in number of styles, varieties, sizes, colors and finishes of the product of an industry; (2) elimination of styles and varieties that required more than the strictly necessary amount of material; (3) elimination of features or accessories that used materials for adornment or convenience which were not actually essential to the serviceability or utility of the product; (4) elimination of patterns and types of products that were less essential to the civilian population; (5) standardization of sizes, lengths, widths, thicknesses, weights, gages, etc., of materials, parts and sections of a product by means of which strength and durability could be obtained with the employment of a minimum quantity of material and labor.

The chief reason for the multiplicity of styles, varieties and sizes was competition, said Mr. Copeland. The excessive variety originated far more commonly in the sales department than in the production department. He was not in favor of a Federal agency in peace time to bring about concerted action in standardizing industries.

Standardization as Trade Economy

Alfred L. Smith, director of Music Industries Chamber of Commerce of U. S. A., in his paper on "Standardization of Products as a Trade Economy," declared that the national trade associations which exist in almost every field of industry offer a most promising means of realizing the benefits of standardization in its fullest sense by making possible maximum progress in individual plants through co-operation. The standardization work of a trade association usually falls into three classes:

1. The work of interesting the members of the trade individually and collectively in the possibilities and benefits of standardization.
2. The work of determining along what general lines standardization is feasible in the trade and stimulating the efforts of individuals along these lines.
3. Most important of all, that work which might be characterized as "standardizing standards" in individual plants and in allied trades.

There are seven especially important trade economies to be obtained by standardization:

1. Decrease in capital investment in all branches of trade and in all individual plants.
2. Elimination of waste in experimentation and designing.
3. More speedy and reliable deliveries.
4. General decrease in prices.
5. The introduction of new processes and machinery facilitated and made possible.
6. Elimination of false and wasteful ideas prevalent in the trade, relative especially to design, quality and methods.
7. Decrease of ruinous competition due to ignorance.

Standardization as Plant Economy

A by-product of the war to which W. E. Freeland directed attention was the subject of his paper, "Standardization of Products as a Plant Economy." The war taught us, he said, the advantage of having but one kind of rifle at the front so that there would be no need of the carrying a multiplicity of repair parts; also of having the same cartridge fit machine rifles and machine guns. At home the standardization of the tools with which munitions were made enabled plants to lend tools to other plants which were temporarily short of needed tools.

One of the most quickly realized benefits of standardization of products, continued Mr. Freeland, is the reduction of inventories and the possibility of contract-

ing for raw materials far in advance of the time of use. In fact, the possibility of making sales, promotion, financial and personnel plans far in advance is greatly enhanced by such standardization and as is well known the ability to plan far ahead of production is one of the prime elements in successful management. Standardization of products leads to standardization of raw materials and thus to possible reductions in raw material inventories.

On sales engineering, Mr. Freeland went on to say, rests the task of eliminating items for which there is not sufficient market demand to warrant investment in tools necessary for modern mass-production. Sometimes a combination of two or more items into one by minor modifications of or additions to a single item are possible. By reducing the number of such items orders may be placed in the factory for larger lot sizes and thus a better flow with a decrease in the inventory of work in process is made feasible. At the same time the factory heads can "tool up" to eliminate handicraft methods and so lessen the importance of the human factor in the maintenance of quality.

A study of the components that make up a line of products, he continued, will show a great similarity and suggest a possibility of standardizing one component for several different items. A direct result of such standardization is a reduction of the worked materials inventory. This is accomplished not alone by the reduction in the number of components carried in stores but also by the reduction in the quantity of any particular component necessary to prevent a break in the assembling operations. By standardizing the components, it is possible to keep a considerable part of the inventory liquid in the form of component stores, assembling these on short notice to meet the sales demand. A great saving results in the reduction in the variety of tools, jigs, fixtures and gages which in itself brings about a decrease in tool inventory and in highly paid designers and toolmakers required on the payroll.

Mr. Freeland dwelt particularly on the need of standardization in machine tools. As large users of machine tools, he pointed out, his company is especially interested in this subject and he lamented the fact that so many makers of general and special machinery are trailing in this matter of standardization. A manufacturer need only compare the cost of maintaining a battery of machines which are exactly alike, and assembled so far as possible from standard components, with a similar number of unstandardized machines to appreciate the economy resulting from the purchase of machines which have been standardized by their manufacturers.

The discussion on Saturday afternoon was especially animated and Chairman Person finally had to inaugurate the five minute rule to give all people desiring an opportunity to speak.

Howard Coonley, president Walworth Mfg. Co., who led the afternoon discussion, spoke from the point of view of the merchandiser. Not only should the physical aspect of standardization of product be considered, he said, but also that which will affect prices and price lists. Considerable blame for lack of standardization should be directed toward the salesman, Mr. Coonley said, but the engineer oftentime also deserves censure. He recited experiences in his own firm with specifications that called for special compositions of valves, unusual sizes, non-standard bolts, etc. A remedy for this is education through advertising, said Mr. Coonley. The speaker then went on to tell of efforts to bring about standardization in his concern. Six hundred out of a total of more than 3000 items have been selected as worthy of emphasis as standardized items and during the first three months of 1921 a special campaign of education will be conducted among jobbers and merchandisers to play up the standardization idea.

Morris L. Cooke, consulting engineer in management, Philadelphia, discussed the subject of standardization of products from the point of view of the industrial engineer. He spoke of the need of separating models into classes. Sometimes it pays to go outside of one's own industry to get the initial ideas on standardization, he said. The interdependence of industries is very marked and it will pay business heads to counsel with heads of other closely related industries for ideas on standardization.

Edwin F. Gay, president New York Evening Post Co. and formerly dean Harvard Graduate School of Business Administration, spoke about standardization from the point of view of the consumer. In most discussion of this subject, he said, the consumer is considered but not consulted. He then went on to tell how in the sixteenth and seventeenth centuries things were more or less standardized, especially clothing, and change came very infrequently, at intervals of centuries at first and then of generations. People in those days fought against changes in standards just as now they would fight against the adoption of standards, particularly in clothing. The consumer, however, is too well educated to permit standardization to go too far.

Economic Risk in Industry

The final meeting, Saturday night, was devoted chiefly to an able address by David Friday, professor of political economy, University of Michigan, on "Risk —A Retarding Factor in Production." The year 1897 closed a definite period in our country's history, the speaker declared, and in the new period developed since then radical changes have been brought about by new methods of accounting, banking, taxation and scientific management. Prof. Friday lamented the fact that in times of descending price levels production decreases and as a result workers are laid off and they and their dependents consequently are made to suffer. The main reason for this, the speaker asserted, is that as prices go down the margin between costs and gross sales becomes so small and the risk of a decreasing profit suddenly becoming a loss is so great that business men rather than risk loss or even failure shut down their plants. Now, if some kind of insurance could be provided in times of decreasing prices and low margins of profit, production could be maintained, he ventured. The lack of suitable production statistics he also gave as a factor of risk in industry.

Joint Meeting on the Long Turn at Steel Works

THAT interest in the three-shift as against the two-shift plan in continuous working industries is widespread was demonstrated at a joint meeting of the Taylor Society, the Management and Metropolitan sections of the American Society of Mechanical Engineers and the New York section of the American Institute of Electrical Engineers, in New York Friday evening, Dec. 30. The appointed topic was "The Long Day in the Steel Industry; A Problem in the Engineering of Men." In the large audience which crowded the main auditorium in the Engineering Societies Building were official delegates of a number of societies and colleges, and several speakers representing industry and engineering took part in the discussion. The main speaker was Horace B. Drury, formerly of the economics department, Ohio State University, who read a paper on "The Three-Shift System in the Steel Industry."

Mr. Drury's paper is the first report of an investigation he has been carrying on for the past three months, in which he visited practically all of the steel plants in the United States working under the three-shift system. The expenses of this investigation were borne in part by sponsors of the Cabot fund. This was left by the well known Massachusetts philanthropist, who as a stockholder in the Steel Corporation moved for an investigation of labor conditions at the Corporation's plants. A full abstract of the report is printed elsewhere.

The discussion following the reading of the paper was noteworthy for its commendation of Mr. Drury's efforts and in the main was favorable to the three-shift plan, not only from the human standpoint but also in the light of results desired by the management.

Before introducing the speaker, Fred J. Miller,

president of the American Society of Mechanical Engineers, chairman of the meeting, told of a strike brought about by the summary dismissal of a committee appointed by machinists in a steel plant to present their objections to continued Sunday work. He made this a text for comment on the trend of things to-day toward a better status for the workman and improved relations between employees and the great corporations which figure to so large an extent in modern industry.

The general discussion was led by Robert B. Wolf, consulting engineer, New York, who told of his experiences in installing the three-shift plan in several wood-pulp plants. He produced a chart showing how in one plant, with a change from a two-shift basis, production increased and became steadier, while labor costs per ton of pulp output decreased. Quality at the same time changed decidedly for the better. The speaker at one time worked on the long turns in pulp mills when he was acquiring a knowledge of the industry. He recalled the 11-hour day and 13-hour night shifts. In looking forward to the alternating week of long night hours, the day men used to say, "Well, next week we go to prison."

William H. Baldwin, formerly secretary of the Ohio Steel Co., Youngstown, Ohio, told of conditions in the steel industry 25 years ago which worked against a change to the three-shift plan. The great objection to the 12-hour day was that it took so much out of the workman and prevented his development into intelligent citizenship. Referring to the Engineering Societies Building as the gift of one whose wealth came from the steel industry, he raised the question how far libraries and like gifts could benefit industrial workers who spent so large a portion of their lives at their daily toil. Yet he did not overlook the fact that to many steel workers libraries made no appeal. Paying tribute to the good wrought by prohibition, the speaker considered the time opportune for the shortening of hours of work in steel plants. While granting that some men would be making a better use of their time if at work than they were likely to make of the leisure hours the short day would give, he agreed with the contention of the paper that American citizens were not made by keeping men constantly under the direction of others.

Though not present at the meeting, C. L. Patterson, secretary of the Bureau of Labor, National Association of Steel and Tin Plate Manufacturers, sent in a written discussion commending Mr. Drury's paper for omitting the usual attacks against "greedy capital" for clinging to the 12-hour day. He pointed out the reasons for continuous working in steel plants and added that all thinking men in the industry were interested in practical means of obviating the 12-hour day. He referred to the bad effect the long turn has on foremen. One foreman whom he quoted regretted the lack of time for study and mental improvement; after the long day in the plant he was so weary mentally that he could read only with the greatest effort.

S. P. Rectanus, director of employment of the American Rolling Mill Co., Middletown, Ohio, after speaking of excellent results obtained in his company's plant with three shifts, created a momentary sensation by asserting that paid propaganda was behind the movement for the extension of the three-shift plan at steel works. After the meeting Mr. Rectanus, on being asked to explain this remark, said that he had been misunderstood and that he would later prepare a statement for the Taylor Society proceedings explaining his attitude. Mr. Rectanus told of his experience when in charge of the galvanizing department at Middletown in 1917. It was the first department outside the sheet mills to go on three shifts. The plan was extended later to the rolling mills and the steel producing departments.

Whiting Williams, formerly director of personnel for the Hydraulic Pressed Steel Co., Cleveland, told of what he had seen in working as a common laborer in British steel mills. He dwelt particularly on the surprise expressed by British workmen who had 8-hour shifts, at the prevalence of the two-shift plan in the steel industry of this country. He had worked for some time also as a common laborer on 12-hour and 13-hour shifts in steel plants in this country. Long shifts in this day, he declared, have a tendency to pull down the quality of the working force. He spoke of it as man-killing and un-American. Bosses under the two-shift plan are of necessity drivers, he said; with the three-shift plan, leadership would be of a better sort.

Harrington Emerson spoke favorably of the three-shift plan but urged that sentimentality be eliminated. It should be treated as an engineering problem and the test should be ability to get better output and more efficient workers. He had had experience with the three-shift plan at a certain steel plant, with the result that production had been increased while cost was reduced.

James T. McCleary, formerly secretary of the American Iron and Steel Institute, made some comment on the discussion, but without passing an opinion on the merits of the three-shift plan.

Prof. Joseph H. Willitts, University of Pennsylvania, made an announcement that the International Labor Office at Geneva is investigating the results obtained from the three-shift day in the steel industries of England, Belgium, France, Germany, Sweden, Spain and Italy. A special questionnaire printed in four languages has been sent to all the foreign governments affiliated with the international labor office. The investigation is the result of a request made through Ernest Greenwood, the Washington representative of the International Labor Office, by Morris L. Cooke, chairman of the research committee of the Taylor Society.

Rothert Process Steel Co. Extensions

The Rothert Process Steel Co., 622 Othello Street, Seattle, Wash., is having plans prepared for extensions to the plant that will increase the present 2-ton capacity to 50 tons. Included in the proposed new equipment will be a rolling mill for rolling small sizes of steel; three 15-ton electric steel furnaces, designed by Dr. E. H. Rothert, owner of the plant, and designer of the present electric furnace in use. The plant manufactures carbon and high-speed steel and alloys, and has orders already booked sufficient to insure the utilization of the capacity of the plant from date of operation. It is planned to start new improvements before Jan. 1. The plant has been in operation in Seattle for three years.

Large Allowance to Workers

WASHINGTON, Dec. 7.—About 2000 workers in the plants of the Minneapolis Steel & Machinery Co. and of other war contractors in Minneapolis and St. Paul have been awarded back pay totaling $700,000 to $800,000 by Secretary of War Baker. The sum is increased compensation during a period of war contracts which was held to be justified by the War Labor Board, but which was never made effective and was disallowed by one board of the War Department but later approved by another War Department agency and finally sustained by the Secretary of War. The amount involved is to be paid by the War Department and not by the companies.

Willing to Contract for Coke

UNIONTOWN, Pa., Dec. 6.—Furnace consumers of coke have sent "feelers" into the Connellsville region tendering $6 for contract coke for the first quarter and first half next year. This is the first indication from the consumers that they are willing to enter contract negotiations. It is also taken to indicate that these buyers believe the coke market will stabilize itself at around $6. Quotations for the last half of this week approximate $7 a ton, ovens, for furnace coke, with little buying.

The Compressed Gas Manufacturers' Association, representing all the compressed gas industries of this country and Canada, will hold its eighth annual meeting Monday, Jan. 17, at 2 p. m., at the Hotel Astor, New York, and its eighth annual dinner on the evening of that day also at the Astor.

BRICK PRICES REDUCED

Demand Declines Sharply and Producing Costs Are Lower

PITTSBURGH, Dec. 6.— Partly in keeping with the decline in iron and steel prices, but to a large degree influenced by a marked falling away in the demand and because of lower producing costs, manufacturers of fire clay and silica brick in all districts have made a horizontal cut of $5 per 1000 in prices. Iron and steel plant activities, barring the United States Steel Corporation, have been on a steadily declining scale for several weeks and this condition has been attended by some rather heavy cancellations, particularly of requirement contracts. Although cancellations and suspensions have not been as heavy in the past week or so as they were previously, they still are coming in and order books of a number of producers now are rather slim. This condition, however, is being met by curtailment of production, for while costs have come down with practically all manufacturers, they still are too high for the stocking of brick against a future revival in the demand.

Manufacturers of fire clay and silica brick have been aided materially in cutting producing costs by the big slump of the past few weeks in the coal market. This development has an important bearing on silica brick prices, for the reason that few plants producing this class of brick are located near coal mines and thus have the price advantage of a short haul. Current prices for coal have put a good many high-costing coal operations out of business and made impossible the maintenance of the recent high wages that were being paid to miners. This has effectually stopped the exodus of men from the clay to the coal mines and once more made possible a full supply of men for the clay mines.

Besides, the passing of the shortage of cars has made it unnecessary for the brick makers to tie up large sums in the carrying of stocks that could not be moved out.

Indications are that the price reduction just announced will be followed by others. Demands at the new prices are moderate in the extreme, while there is a dearth of new blast or open hearth furnace or by-product coke plant construction, and iron and steel companies appear to have plenty of brick to meet the requirements of repair work. Prices of magnesite and chrome brick have been cut $10 per net ton.

We quote per 1,000 f.o.b. works:

Fire Clay:	High Duty.	Moderate Duty.
Pennsylvania	$45.00 to $55.00	$40.00 to $45.00
Ohio	42.00 to 50.00	35.00 to 40.00
Kentucky	45.00 to 50.00	40.00 to 45.00
Illinois	45.00 to 55.00	35.00 to 45.00
Missouri	55.00 to 60.00	40.00 to 50.00
Silica Brick:		
Pennsylvania		$50.00 to $55.00
Chicago		60.00
Birmingham		50.00 to 55.00
Magnesite Brick:		
Standard size, per net ton		100.00
Chrome Brick:		
Standard size, per net on		80.00 to 90.00
Bauxite Brick:		
55 per cent per net ton		50.00
76 per cent per net ton		90.00

Opposed to National Boards

Washington, Dec. 7.—The Board of Directors of the Chamber of Commerce of the United States has adopted a resolution to oppose the creation of National railroad boards of labor adjustment as advocated by railroad employees. The transportation act provides that the carriers and other employees may, by agreement, establish local, regional or National boards for settlement of all controversies not directly involving wage disputes. Disputes have remained unsettled because of failure of the roads and their men to agree as to which of the three types should be set up. A majority of the carriers favor local boards, while employees are united in advocacy of the creation of National boards.

It is contended by the directors of the Chamber of Commerce that the functioning of the proposed National boards of labor adjustment will inevitably lessen efficiency and impair the discipline necessary to the successful operation of the railroad system of the United States under private control subject to Government regulation. Such National boards of adjustment, it is claimed, will effectually prevent open shop operation under which the employer and employee may enter into a determination of conditions of employment relations with each other. It is declared that the operation of the National boards would make impossible intelligent and practical co-operation directly between employers and employees.

British Steel Exports Small in October—Imports Heavy

British steel exports in October, this year, excluding iron ore and including scrap, were 277,183 gross tons, which compare with 256,280 tons in September, with 262,676 tons per month in the first quarter, 298,287 tons per month in the second quarter and with 308,459 tons per month in the third quarter. The exports and imports thus far this year are shown by the following table in gross tons:

	Exports	Imports
January	261,248	79,024
February	231,065	71,997
March	295,716	72,491
April	274,337	71,161
May	332,869	83,431
June	287,655	131,476
July	393,016	142,428
August	276,083	92,628
September	256,280	173,838
October	277,183	188,875

The October export figures, while a little larger than the September outgo, are 31,276 tons less than the average for the third quarter, and 115,833 tons less than the July exports. The total exports for the first 10 months have been 2,868,625 tons, or 286,862 tons per month, as compared with 1,822,938 tons to Nov. 1, 1919.

The October imports are the largest for the year, or 188,875 tons. The imports to Nov. 1, 1920, have been 1,180,856 tons, as against 488,974 tons to Nov. 1, 1919.

The following summary gives the relative exports and imports of the first quarter and first half and third quarter of 1919 and 1920, as well as the average per month for 1913 and 1919 in gross tons:

	Exports	Imports
Average first quarter, 1919	147,228	44,713
Average first half, 1919	170,139	37,483
Average third quarter, 1919	180,090	44,514
October, 1919	202,121	88,349
Average first quarter, 1920	262,676	74,504
Average first nine months, 1920	287,938	110,220
Average third quarter, 1920	308,459	136,298
October, 1920	277,183	188,875
Average per month, 1913	420,757	195,264
Average per month, 1919	204,516	51,557

The trend of some of the principal exports is shown by the following data in gross tons:

	Av. Per Month 1913	Av. Per Month 1919	Oct. 1919	Oct. 1920
Pig iron	78,771	21,503	21,716	25,218
Steel rails	41,676	10,435	14,448	11,257
Steel plates	11,162	19,996	15,750	21,491
Steel bars	20,921	20,787	17,330	32,260
Galvanized sheets	63,506	15,508	22,251	29,196
Tin plates	41,208	24,147	27,085	36,204
Black plates	5,679	11,109	5,640	4,300

The principal export gains in October, 1920, over October, 1919, and the 1919 monthly average have been in pig iron, steel bars, steel plates, galvanized sheets and tin plates. In all the above items the falling off in October as well as in September as compared with July, this year, was pronounced.

Pig iron imports in October were 18,300 tons, against 14,244 tons in October, 1919. The average per month in 1919 was 13,623 tons, and in 1913 it was 18,059 tons per month.

Iron ore imports in October this year were 426,179 tons, bringing the total to Nov. 1 to 5,621,569 tons, as compared with 4,493,188 tons to Nov. 1, 1919.

Manganese ore imports in October, 1920, were 46,723 tons. These compare with 9,827 tons in October, 1919, and with 50,098 tons per month in all of 1913. The total for the first 10 months of this year has been 373,820 tons, against 242,095 tons to Nov. 1, 1919. The average per month in 1919 was 22,150 tons.

American Engineering Standards Committee

At the annual meeting of the American Engineering Standards Committee held in New York on Dec. 4 A. A. Stevenson, representative of the American Society for Testing Materials, was re-elected chairman for 1921 and George C. Stone, representative of the American Institute of Mining and Metallurgical Engineers, was re-elected vice-chairman. The following were also elected to represent the respective member-bodies on the executive committee:

Comfort A. Adams, American Institute of Electrical Engineers.
Martin Schreiber, American Society of Civil Engineers.
Fred E. Rogers, American Society of Mechanical Engineers.
A. H. Moore, Electrical Manufacturers Council.
Dana Pierce, Fire Protection Group.
A. Cressy Morrison, Gas Group.
N. A. Carle, National Electrical Light Association.
Albert W. Whitney, National Safety Council.
Coker F. Clarkson, Society of Automotive Engineers.
Thomas H. MacDonald, U. S. Department of Agriculture.
E. B. Rosa, U. S. Department of Commerce.
O. P. Hood, U. S. Department of Interior.
Francis J. Cleary, U. S. Navy Department.
J. H. Rice, U. S. War Department.

There are now 47 members of the committee, representing 17 member-bodies. Twenty-four organizations in all are represented on the committee, as three of the member-bodies are groups of organizations. The gas group consists of the American Gas Association, Compressed Gas Manufacturers' Association and the International Acetylene Association.

Tinius Olsen Testing Machine Co.

The Tinius Olsen Testing Machine Co., manufacturer of testing machines and presses, scales, hoists, etc., 500 North Twelfth Street, Philadelphia, has succeeded the Lippincott-Carwen Corporation in the manufacture of the Carwen static-dynamic balancing machines, which are built both in horizontal and vertical types in accordance with the Akimoff and Lundgren patents. By means of this balancing machine, it is claimed that all vibrations can be eliminated due to unbalance in rotating parts and a perfect balance thus secured with both speed and economy. Previously balancing was accomplished by hand methods of a cut and try variety which required considerable time to perform. The Lippincott-Carwen Corporation succeeded the Carlson-Wenstrom Co., Philadelphia, which first built the Carwen balancing machines.

W. Z. Foster, leader of the steel strike of 1919, and author of the notorious red book on Syndicalism, was scheduled to address a meeting at the Odeon Hall in Cincinnati on Friday evening, Dec. 3, under the auspices of the Amalgamated Clothing Workers, on the subject of "Great Strikes, and Why They Are Lost." The trustees of the College of Music, however, refused to allow the meeting to be held there. Their action was taken on the grounds that the hall was primarily intended for concerts and recitals by the College of Music, and as nothing of a musical nature was intended, they felt obliged to refuse the use of the hall.

An idea of the production of the new blast furnaces of the Ford Motor Co., at River Rouge, is given by a recent official announcement of the output of furnace A for October, which was 14,742 tons, as compared with 13,640 tons for September. For each ton of iron produced in September there was consumed 2,242 lb. of coke, while in October only 2,169 lb. of coke were required for each ton of iron.

Reports made to headquarters of the labor unions at Montreal, Nov. 30, stated that 1100 workers had been laid off temporarily at the Angus shops of the Canadian Pacific Railroad. These reports were confirmed by J. T. Foster, president of the Trades and Labor Council, who added that the same conditions obtained, not only at the Angus shops, but practically all the metal industry shops in Montreal and district.

TRADE CHANGES

The National Steel Co., Chicago, has established a warehouse at 827 Rees Street, stocked with cold drawn screw stock and shafting, cold drawn bars in S. A. E. analyses, sheet steel, hot rolled and cold rolled strip steel and tin plate. The warehouse is located on the Chicago, Milwaukee & St. Paul Railroad siding. E. G. Fisher, president; H. G. Masten, vice-president; and Miss A. O'Brien, secretary and treasurer of the company, are well versed in the steel business. Offices are at 111 West Washington Street, Suite 1213 Conway Building, Chicago.

The Black & Decker Mfg. Co., Baltimore, portable electric tools, electric air compressors, and special machinery, has established a new branch office at 303 Penn Avenue, Pittsburgh, to be the headquarters for the sales force in western New York, western Pennsylvania and northwestern West Virginia. The office will be in charge of W. D. Royer, formerly sales engineer Robbins Electric Co., Pittsburgh. A service station has also been established at the same address and a factory-trained mechanic will be on hand to offer service to users of Black & Decker products in that territory.

The F. C. Sanford Mfg. Co., 2060 Fairfield Avenue, Bridgeport, Conn., announces that Russell Holbrook & Henderson, Inc., 30 Church Street, New York, are no longer representing it in the sale of precision centerless cylindrical grinders.

The Kearney & Trecker Corporation, Milwaukee, was incorporated the past week with an authorized capitalization of $2,500,000 as a development of the machine tool business conducted as the Kearney & Trecker Co., Milwaukee, since 1898. The charter authorizes the new corporation to deal in machinery, inventions, patents, real estate, bonds, etc., and to act as agent for other corporations engaged in similar business. The incorporators are W. C. Quarles, Julian Olds and J. A. Dietrich, members of the law firm of Quarles, Spense & Quarles, 91 Mason Street, Milwaukee. A more detailed statement will be forthcoming as soon as the new corporation has perfected its organization.

The Oxweld Acetylene Co. announces the appointment of the Standard Supply & Equipment Co., New York and Philadelphia, as eastern sales agent for Eveready welding and cutting apparatus and supplies. The Standard Supply & Equipment Co. deals in shelf and heavy hardware, machinery, mill and mine supplies, automobile accessories, etc., and has, besides its New York and Philadelphia establishments, branch houses in New Haven, Hartford, Springfield, Worcester, Pittsburgh, Trenton and Altoona. The company has appointed as manager of its welding and cutting equipment department, George E. Temple, for six years with the Prest-O-Lite Co., which formerly manufactured and marketed the Eveready apparatus.

The Industrial Equipment Co., 149 Broadway, New York, has been appointed exclusive eastern agent, including the New England and Southern States, for the hand-power cranes manufactured by H. D. Conkey & Co., Mendota, Ill. The company manufactures hand-power cranes ranging from ½-ton to 10-ton capacity, jib cranes and I-beam trolleys. The grinding and polishing machinery, structural steel and industrial cars, which the company also produces, are handled through other agencies. J. D. Spensley, Industrial Equipment Co., will be in charge of sales.

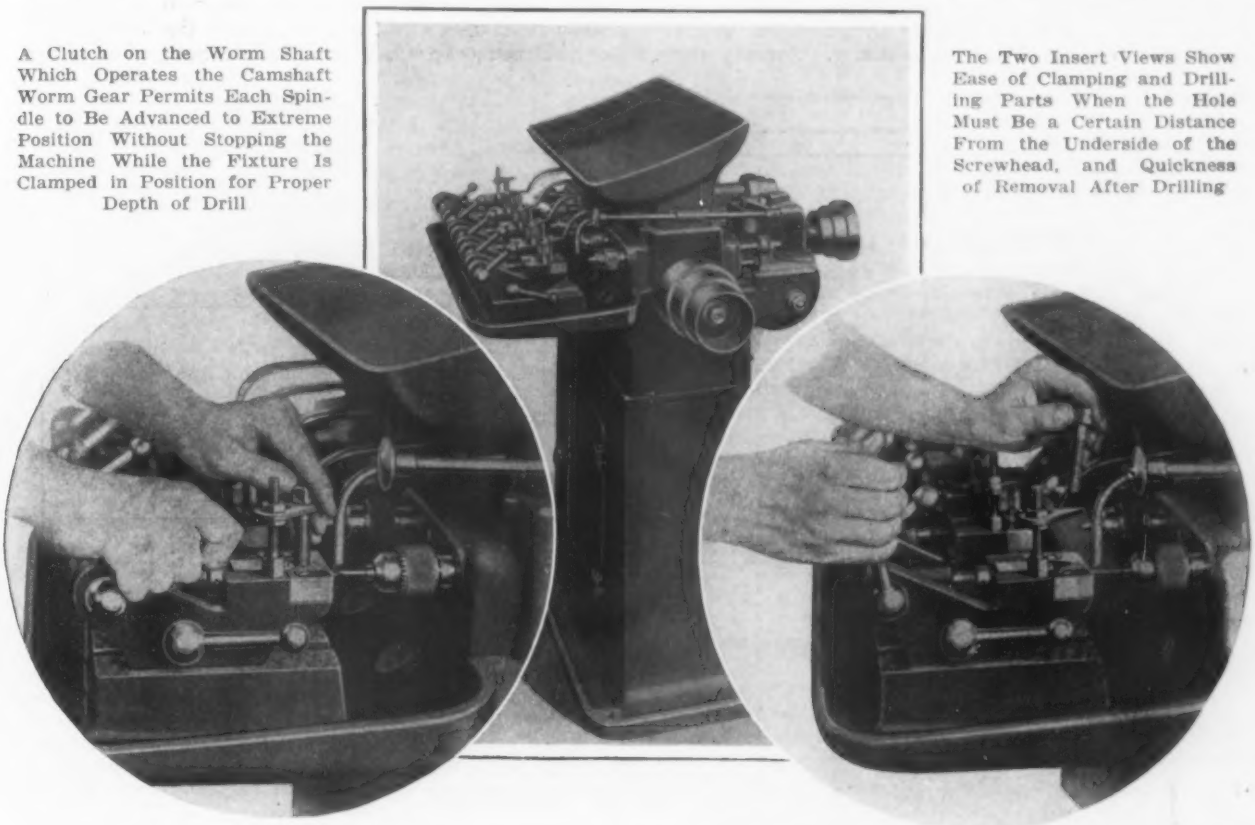
The Atlas Crucible Steel Co. announces the opening of its new sales office and warehouse at 3567 Lindell Boulevard, St. Louis, Mo., where a complete stock of high grade tool steels will be carried.

The Miner & Peck Mfg. Co., for the past 40 years located in New Haven, Conn., has been taken over by the Birmingham Iron Foundry, Derby, Conn. The business has moved to Derby but will be operated under name Miner & Peck Mfg. Co., and George W. Peck will continue in charge.

Semi-Automatic Drilling Machine

Two new features have been incorporated in the semi-automatic drilling machine manufactured by the Detroit Machine Tool Co., Detroit. The principal feature is the clutch placed on the worm shaft which operates the camshaft worm gear. The long slender rod, shown on the right-hand side of the machine in an accompanying illustration, engages and disengages a toothed sleeve to a constantly revolving worm which has teeth cut in the end. This is an ordinary tooth clutch. This feature is of particular advantage when the machine is being set up and it is desired to clamp the fixtures in place on the table, so that the proper depth of hole is drilled. The spindles now can be brought forward to their extreme positions and then left there without stopping the machine while the operator brings forward the fixtures, notes the depth of the drills in the fixtures and then clamps them in place. This clutch is also convenient when the operator wishes to remove chips which accumulate underneath the fixtures. It also provides for stopping feeding of the drills quickly when the drill sticks in hard spots, as is often the case in forgings and chrome-nickel steel.

A Clutch on the Worm Shaft Which Operates the Camshaft Worm Gear Permits Each Spindle to Be Advanced to Extreme Position Without Stopping the Machine While the Fixture Is Clamped in Position for Proper Depth of Drill



The Two Insert Views Show Ease of Clamping and Drilling Parts When the Hole Must Be a Certain Distance From the Underside of the Screwhead, and Quickness of Removal After Drilling

Another feature is the work pan which is made with a sloping bottom so that the parts will slide down and be in convenient reach of the operator. This pan, it is stated, will hold three times the amount of parts held by the old pan.

The company's standard No. 6100 fixture with improved V-jaw and standard machine handles is shown mounted on the machine. To insure convenient and accurate alignment of bushings which guide the drill, the holes are first lapped and then the walls on the inside of the V-jaw are ground, so that they are central with the hole. The jaw is then assembled on the fixture and lined up, so that when the fixture is clamped in place on any machine the hole in the jaw is within 0.001 in. of alignment with the spindle of the machine. The detail view of the fixture shows how to handle the drilling of parts where the hole must be a certain distance from the underside of the screwhead. When the hole must be measured from the end of the piece a heel pin gage is used. This illustration also shows the convenience and rapidity with which the work can be clamped in place. The centralizing aligning and clamping of round or hexagon objects is done in a short, straight line movement of the operator's right hand on the clamping lever of the fixture. Because the angle of the V-jaw is 60 deg., hexagon work can be handled equally well. This arrangement also takes care of variation in diameter.

Sheet Mills of Republic Iron & Steel Co.

Completion early in 1921 of eight modern sheet mills at the Niles plant of the Republic Iron & Steel Co. will give that interest an annual productive capacity of 140,000 tons of blue annealed, black and galvanized sheets and roofing products. Under normal conditions, it is expected the entire complement of mills will produce 12,000 tons per month. The principal products of the Niles plant will be black and galvanized sheets, the blue annealed tonnage ranging from 16,000 to 18,000 tons per year. New units will be operated in preference to the old, after their completion, in case conditions do not justify operation of the whole.

The Niles plant was originally acquired by the Republic company from the old DeForest Sheet & Tinplate Co., which has since virtually gone out of existence. The property consisted of nine sheet mills and one jobbing mill, with a manufacturing site of 225 acres. The Republic company has effected many improvements to the old plant, including the installation of electrical equipment.

The new mills are housed in steel buildings erected parallel to the older buildings housing the original units. Until the Republic Iron & Steel Co. acquired the Niles works, it had not been engaged in sheet production, its principal products thereto having been iron and steel bars, light structural shapes, pipe, plates, bolts, shafting and railroad spikes.

A broad extension program is planned at Niles, which is located ten miles from the main plant at Youngstown, but until a later date no further additions will be undertaken upon completion of the sheet mill units now being installed.

The F. H. Bickford Co., Dayton, Ohio, has been incorporated with a capitalization of $10,000, to take over the tool designing and equipment engineering business formerly conducted by the firm of Bickford & Hull, and from which Mr. Hull recently retired.

Electric Furnace with a Repelling Arc

Unique Features of the Von Schlegell Unit—Its Electric Torch Capable of Several Industrial Applications—Now Used on Non-Ferrous Metals

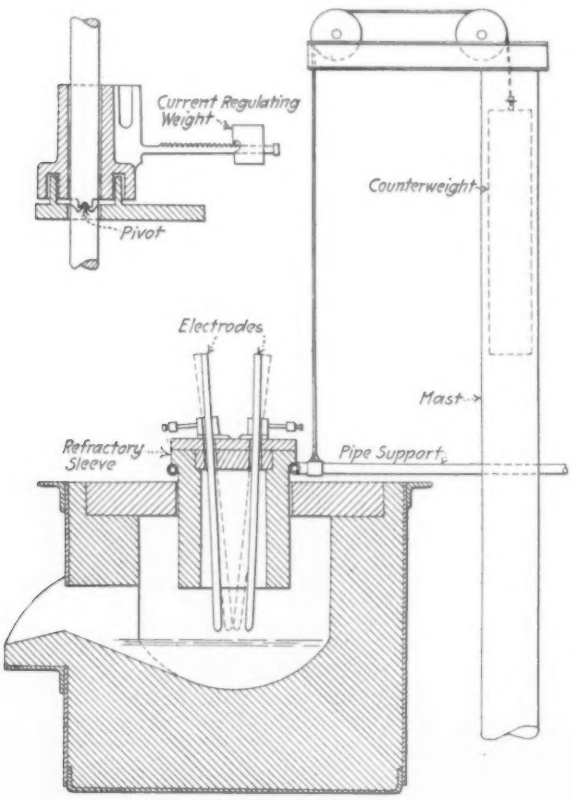
AN electric furnace for steel and non-ferrous operations has been developed by the Industrial Electric Furnace Co., Chicago, which has features distinguishing it from other furnaces in the melting and refining field. It is known as the Von Schlegell repelling arc furnace. It is virtually an electric torch and as such is claimed capable of industrial applications other than in the metal industry. Already three of these furnaces are being used in melting non-ferrous metals and one is making aluminum steel. The furnace is the invention of F. Von Schlegell, president of the company. A brief discussion of its important features is furnished by the inventor as follows:

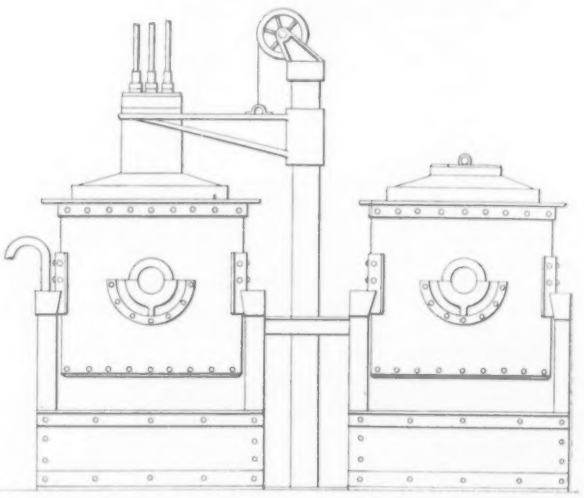
Many electrical people have asked what we mean by the phrase "repelling arc," what are its advantages and why. It is a self-regulating, flaming arc torch which can be operated from 220-volt motor circuits and suspended into various kinds of chambers for high temperature with deoxidizing conditions maintained.

In answer to the question, "What is the repelling arc?" we offer a drawing which reveals the reason why we call it a torch suspended in a furnace body. By dotted lines we have indicated the electrodes in a relapsed position, that is, the position which the electrodes take when there is no current passing. The bottom ends touch each other. They are drawn together by adjustable weights, as indicated. As soon as current flows, the repulsion between electrodes and the flow forces the electrodes apart, thus drawing the arc.

The amount of repulsion is proportionate to the amperes which flow, or conversely, the amount of current is proportionate to the amount of repulsion needed to separate the electrodes, and establish the desired arc. Consequently, moving the adjustable weights in or out will vary the amount of repulsion needed and, therefore, will vary the amount of current, that is, moving the regulating weights out shortens the arc length, thereby decreasing resistance and permits more current to flow just as if the desired amount of current was being weighed out.

The electrodes, it will be noted, are placed about the same as electrodes are placed in a flaming arc lamp and the arc is very similar to that given by a flaming arc lamp. It will be noted that the operation of this arc differs from that of other arcs in that the usual practice in drawing arcs is by longitudinal movement of the electrode, while in our case it is entirely accomplished by lateral movement and the repulsion between electrodes is the force which gives this lateral movement. This repulsion also drives the arcs down from the ends of the electrodes.





Cross-Section (Left) of the Von Schlegell Repelling Arc Furnace Showing Position of the Electrodes at Rest and When Operating as Well as the Method of Introducing Them Into the Furnace Producing the Torch Effect

The Ease with Which One Set of Electrodes or One Torch Can Be Applied to Two Furnaces Is Represented by the Other Sketch

One of the most desirable things in electric arc furnaces is to overcome the fact that with changes of temperature and melting of the material in the furnace, as well as the wear of electrodes, the influences affecting the current in the arc are constantly changing to make the arc unsteady. In this type of construction, the electrodes being approximately parallel when in operating position, the relative position of their ends is not affected by the wearing of the electrodes, or the melting down of materials. All other changes are immediately compensated for by the fact that every decrease in current allows the ends of the electrodes to come closer together and if any influence should break the arc, it immediately re-establishes itself. Unusual smoothness of operation results.

Another important advantage is the fact that because the electrodes can be raised and lowered as a unit, or in a cluster, rather than individually, it is possible to use gas-tight electrode joints. This prevents any flame coming up around the electrodes, prevents the rapid wear on electrodes which occurs in other types of furnaces and obviates the necessity of water-cooled electrode holders. The electrodes being so close together and parallel, the arcs are repelled into bow shapes, which makes it possible to use higher voltage

than if they were straight arcs. This bow shape of the arc adds to the elasticity of the arc.

Furthermore, the fact that all electrodes are moved in a cluster, or as a unit, makes it possible to maintain either the direct arc in which two or three arcs will be between electrode ends and the material being heated, or the indirect arc in which the arcs are between ends of electrodes and independent of other materials. To change the type of arc from direct to indirect, the relative distance between electrodes and the metal is increased by merely raising the electrode cluster.

The fact that all three electrodes are handled in a cluster, and that the arcs are inherently self regulating, makes it possible to suspend the same cluster or torch alternately in either one of several furnace bodies. This is shown by one of the illustrations, where we show two furnace bodies with the torch suspended into one, while the other is being charged and preheated with oil. This really makes possible the use of two furnaces with the cost of but one set of electrical equipment. One shell may be basic and the other acid, or the two shells may be used for melting different metals.

Another illustration shows one of these furnaces in operation at a Chicago plant, melting Monel metal. This is particularly interesting because the clearness of the conditions around the electrode holders is obvious, even though the furnace is in operation. Still another illustration shows the application of the repelling arc torch of 500 kva. as a substitute for the electrical equipment on a Rennerfelt furnace at the plant of the Chicago Bearing Metal Co. The only changes made in the original Rennerfelt furnace was the removal of all old electrical equipment, the cutting of a round hole in the top of the furnace, and the adding of the Von Schlegell repelling arc cluster. The illustration shows the torch lifted out of position while the furnace is pouring.

On the Von Schlegell furnaces no adjustment is made of the electrodes during heats. The torch is merely lowered during the process as the material melts down.

Other applications of this torch for industrial purposes would be in heating furnaces for forging; melting the alloys and heating large ladles preparatory for adding charges; for work on non-conductive materials, particularly such classes of metallurgical work where it is desired to hold an intense heat within a body of ore or sand, similar to the manufacture of manganese, glass, etc.

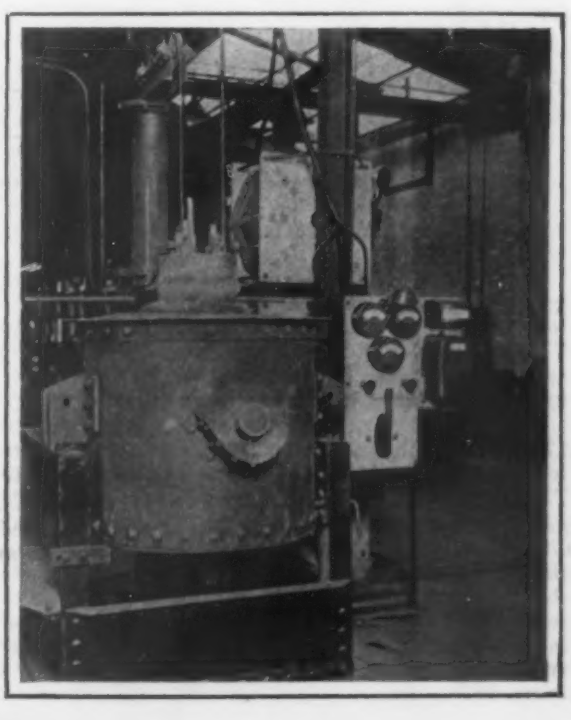
New Organization Acquires Toledo Bridge & Crane Co.

The Toledo Crane Co., Bucyrus, Ohio, has been organized under the laws of Ohio with a paid-up capital stock of $500,000 and will on Jan. 1 succeed the Toledo Bridge & Crane Co., Toledo, Ohio. The new company recently purchased all drawings, patterns, records and other materials pertaining to the manufacture of Toledo cranes and has several sites in Bucyrus under consideration for its new plant. Plans for the new buildings include a machine shop 60 x 300 ft., a structural steel shop 90 x 300 ft., an assembling shop 120 x 320 ft., a pattern shop and storage building 75 x 200 ft. and a forge shop 40 x 100 ft. Steel for the buildings, machine tools and other equipment has been ordered.

About eight of the heads of departments formerly with the Toledo Bridge & Crane Co. will be identified with the new company as well as a few of the office workers and employees of the shops. The principal organizers of the new company are Charles F. Michael, president Ohio Crane Co., and Albert G. Stoltz and W. H. Picking, president and vice-president Second National Bank of Bucyrus and stockholders in the Ohio Crane Co. W. F. Billingsley, who has been active in the management of the Toledo Bridge & Crane Co. for the past 11 years, will hold a prominent position in the new organization. No immediate changes are contemplated in the district offices.

The next convention of the Society of Industrial Engineers will be held April 27, 28 and 29 at Milwaukee. The bound printed report of the recent Pittsburgh convention devoted to industrial education will be ready for distribution about Jan. 1, 1921. George C. Dent, 327 South La Salle Street, Chicago, is the business manager.

Property of the Seaboard Steel & Manganese Corporation, Reading, Pa., comprising the Temple furnace and other assets, will be sold by the Guaranty Trust Co., New York, trustee and complainant, at an adjourned sale, scheduled under a previous sale early in November.



An Old Rennerfelt Furnace (Left) to Which This Von Schlegell Torch Has Been Applied. The electrodes are shown withdrawn while the metal is being poured. A Von Schlegell furnace in operation on monel metal is represented by the other illustration

Increase of Iron and Steel Exports in October

Much Larger Tonnage of Plates Sent Abroad—Heavy Movement of Scrap—Value of Machinery $7,000,000 More Than in October of Last Year—Imports Decline

WASHINGTON, Dec. 14.—Exports of iron and steel in October, 1919, revealed a large increase over the October, 1919, figures, as well as over those for September, 1920. These increases are shown both in the tonnage figures and in the totals of valuations. They are in keeping with the general increases in exports for October, 1920, as shown by the preliminary figures compiled by the Bureau of Foreign and Domestic Commerce. The same figures show a slight decrease in the tonnage of iron and steel imports for October, 1920, against October, 1919, but the valuation figures of the imports show the increase which has become a monthly feature of the iron and steel market.

The total exports of iron and steel manufactures for October, 1920, aggregated $103,998,528, against $76,157,791 in October, 1919, and $87,556,292 in September, 1920. For the ten months' period ending with October, 1920, this total was $885,222,563, against an aggregate, for the same ten months of last year, of $834,197,503.

Exports of Iron and Steel

	Gross Tons			
	October		Ten Months	
	1919	1920	1919	1920
Ferromanganese	934	716	2,917	2,170
Ferrosilicon	6	200	4,796	601
All other pig iron	13,168	16,380	277,507	190,100
Scrap	2,325	20,947	17,014	187,528
Bar iron	2,687	5,401	55,783	36,202
Wire rods	8,810	8,434	102,633	105,843
Steel bars	45,179	49,209	477,239	508,389
Steel billets, ingots and blooms, n.e.s.	20,713	11,853	223,675	206,416
Bolts and nuts	2,521	3,356	35,175	31,256
Hoops and bands	3,884	5,275	44,316	44,715
Horseshoes	52	321	3,059	1,734
Cut nails	126	445	2,679	2,570
Wire nails	5,323	9,044	81,774	71,018
All other nails including tacks	753	1,460	14,619	9,161
Cast-iron pipes and fittings	1,623	7,380	30,202	49,079
Wrought-iron pipes and fittings	17,490	24,539	309,325	219,806
Radiators and cast-iron house-heating boilers	275	913	3,769	6,237
Railroad spikes	1,294	1,578	22,804	13,414
Steel rails	43,730	53,266	563,958	473,940
Galvanized sheets and plates	6,758	8,717	87,295	89,059
All other sheets and plates	2,426	3,375	35,944	24,639
Steel plates	40,660	91,093	598,569	726,979
Steel sheets	13,861	17,129	157,051	135,896
Plates punched and shaped (ship)	1,114	3,071	11,193	35,216
Structural iron and steel	26,641	53,989	322,238	387,378
Tin and terne plates	11,938	20,288	170,218	189,988
Barb wire	11,711	13,654	82,628	100,716
All other wire	16,444	19,982	170,128	146,618
Total	302,456	452,015	3,908,508	3,996,668

In October, 1920, the exports of iron and steel aggregated 452,015 gross tons, against a total of 302,456 tons in October, 1919, and 409,200 in September, 1920. This makes a total of 3,996,668 gross tons of iron and steel exports in the first ten months of 1920, against an aggregate of 3,908,508 for the same period of 1919.

Exports of various forms of pig iron aggregated 17,296 gross tons in October, 1920, against 14,108 gross tons in October, 1919, and 22,724 in September, 1920. The ten months' figures, however, show a total of 192,871 for the first ten months of the current year against 285,220 tons for the first ten months of 1919. Among the interesting fluctuations of the pig iron exports is the fact that the exports to the United Kingdom totaled 28,060 gross tons in October, 1919, and 4324 in October, 1920, while the exports to Canada increased from 1046 tons in October, 1919, to 8544 tons in October, 1920.

The exports of steel billets, ingots and blooms totaled only 11,853 tons in October, 1920, against 20,713 in October, 1919, and 18,113 tons in September, 1920. The reduction is chiefly due to the fact that France, which imported 4366 tons in October, 1919, received none in October, 1920, and Italy, which imported 3794 tons in October, 1919, imported 711 tons in October, 1920.

Steel rails showed an increase from 43,730 tons in October, 1919, to 53,266 in October, 1920. The September, 1920, figure, however, was only 31,170 tons. As an index to price changes, it is interesting to note that the 43,730 tons of rails exported in October, 1919, were invoiced at $2,479,648, and the 53,266 tons of October, 1920, at $3,426,691. For the first ten months of 1919, the exports of steel rails aggregated 563,958 tons, valued at $33,757,063 and for the first ten months of the current year they totaled 473,940, worth $28,693,097. Cuba continued the chief purchaser of rails, taking 11,983 tons in October, 1920, against 6454 for October, 1919. The rail exports to Japan aggregated 4745 tons against 13,505 in October, 1919.

Imports of Iron and Steel

	Gross Tons			
	October		Ten Months	
	1919	1920	1919	1920
Ferromanganese	4,025	6,700	22,674	46,739
Ferrosilicon	1,601	1,239	7,235	12,882
All other pig iron	12,755	15,938	42,419	118,068
Scrap (including tin scrap)	20,068	10,998	146,498	130,871
Bar iron	106	522	1,354	4,570
Structural iron and steel	47	139	790	1,252
Steel billets without alloys	781	640	3,907	18,674
All other steel billets	633	448	3,791	3,988
Steel rails	590	1,688	15,256	43,752
Sheets and plates	44	174	761	1,495
Tin and terne plates	3	43	147	322
Wire rods	52	1,257	201	4,591
Total	40,705	39,786	245,033	387,204
Manganese ore and oxide of	15,863	44,700	285,274	467,712

Exports, January, 1919, to October, 1920

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Total	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853

The largest increase in the exports is shown in the figures for steel plates, which jumped from 40,660 tons in October, 1919, to 91,093 in October, 1920. The September figure was 75,612. Much of this increase was due to the fact that the steel exports to the United Kingdom rose from 2883 tons in October, 1919, to

Exports of Machinery

	October		Ten Months	
	1919	1920	1919	1920
Adding machines	$297,412	$1,056,600	$3,434,581	$5,070,468
Air compressing machinery	343,228	466,762	3,170,444	4,250,748
Brewers machinery	1,158	32,243	149,044	431,489
Cash registers	735,273	231,590	3,273,543	4,631,876
Parts of	37,157	37,238	238,044	402,688
Concrete mixers	21,819	123,528	166,261	685,707
Cotton gins	1,405	20,694	289,766	382,674
Cream separators	106,162	114,105	1,612,530	966,541
Elevators and elevator machinery	118,120	111,536	2,393,602	1,137,497
Electric locomotives	51,130	17,450	790,788	861,580
Gas engines, stationary	78,994	71,699	534,014	655,591
Gasoline engines	2,422,528	2,537,544	28,790,221	30,535,634
Kerosene engines	587,707	1,233,634	7,006,857	9,046,625
Steam engines	5,698,233	4,302,630	27,583,583	49,192,749
All other engines	138,387	360,207	3,014,864	3,764,423
Boilers	501,567	739,423	4,984,279	5,988,340
Boiler tubes	263,220	803,413	7,365,616	4,477,711
All other parts of engines	1,570,410	2,628,994	21,360,855	17,876,169
Excavating machinery	163,473	175,424	885,529	1,667,341
Milling machinery, flour, grist	77,658	123,358	2,016,962	1,463,234
Laundry machinery, power	62,046	116,339	599,052	976,460
All other	23,777	73,373	320,123	620,349
Lawn mowers	23,712	44,402	437,695	313,983
Lathes	784,964	358,088	8,881,344	6,356,085
Other machine tools	927,881	1,170,075	10,646,839	11,564,843
Sharpening and grinding machines	468,963	247,788	4,810,218	3,393,802
All other metal-working machines	2,897,778	1,556,908	26,217,816	15,899,173
Meters, gas and water	75,853	85,110	659,024	593,176
Mining machinery, oil well	147,513	543,842	2,810,907	4,379,698
All other	485,582	874,257	8,226,906	7,299,471
Paper-mill machinery	213,289	502,640	3,455,604	2,218,149
Printing presses	307,811	773,852	2,904,753	7,233,619
Pumps and pumping machinery	852,394	1,422,846	7,504,386	10,226,065
Refrigerating and ice-making machinery	197,917	237,883	1,862,521	2,939,662
Road-making machinery	131,855	130,938	833,842	1,061,497
Sewing machines	799,172	1,125,492	10,327,718	12,751,628
Shoe machinery	346,124	278,996	2,402,078	1,952,302
Sugar-mill machinery	1,807,312	2,762,233	10,686,865	14,295,744
Textile machinery	1,148,503	1,610,057	12,590,501	16,460,126
Typesetting machines	221,791	434,108	3,412,002	4,080,634
Typewriting machines	1,494,840	1,891,538	14,505,007	20,891,885
Windmills	72,548	127,926	886,868	1,536,825
Woodworking machinery	61,495	103,343	1,049,428	915,008
All other	275,490	286,751	2,157,797	2,909,837
All other machinery and parts of	6,494,569	8,740,658	61,760,825	76,595,966
Total	$33,530,888	$40,587,520	$317,813,692	$370,954,712

21,625 tons in October, 1920; while Italy, which is reported as receiving no steel plates in October, 1919, imported 9241 tons in October, 1920.

Scrap exports again showed a huge increase, from 3335 tons in October, 1919, to 20,947 tons in October, 1920. The latter figure, however, is less than half the September, 1920, outgo of 44,660 tons.

Valuation figures increased all along the line. The comparison of the October, 1920, figures with those of October, 1919, revealed that the pig iron exports increased $400,000; scrap, $630,000; steel bars and rods, $1,400,000; bolts and nuts, $200,000; hoops and bands, $200,000; nails, $800,000; pipes, $1,300,000; rails, $1,000,000; sheets and plates, $7,000,000, and wire and manufactures of wire, $2,200,000.

Exports of machinery increased a round $7,000,000 in October, 1920, over October, 1919—$40,587,520 against $33,530,888. The September, 1920, figure was $36,008,016. For the ten months ending with October, 1920, the machinery exports aggregated $370,954,712, against $317,813,692 for the same ten months of 1919.

The October exports of engines and engine parts aggregated $12,594,994, against $11,322,803 in October, 1919, and $11,811,985 in September, 1920. This brings the total for the first ten months of 1920 to $122,398,922, against $101,440,035 for the corresponding period of 1919. The exports of metal-working machinery dropped from $5,079,586 in October, 1919, to $3,332,859 in October, 1920. The September, 1920, total was $3,207,143. During the first ten months of 1919 these exports aggregated $50,556,217 against $37,213,903 for the first ten months of the current year. The slump in the latter figures is due to the fact that in the first ten months of 1919 France bought $13,406,312 worth of American metal-working machinery, against $6,860,254 in the first months of 1920. In the same period of 1919 the United Kingdom imported $13,149,443 worth of these items and only $9,284,237 in the first ten months of this year. The only noteworthy increase in metal-working exports is shown in the outgo to Canada, which totaled $2,938,153 for the first ten months of 1919, and $5,346,467 for the first ten months of 1920.

A slight decline in tonnage of iron and steel imports is again the result of the heavy decrease in scrap importations. These figures now include tin scrap and show a total of 10,998 tons of imports in October, 1920, against 20,068 tons in October, 1919, and 9486 tons in September, 1920. The low valuation of the scrap imports, however, leaves the valuation of the imports decidedly above the preceding figures. The October, 1920, total of iron and steel imports was $4,851,522, against $2,373,138 in October, 1919, and $4,771,484 in September, 1920. For the first ten months of 1920 this makes up an aggregate of $43,493,369 against $19,745,907 for the first ten months of 1919. The tonnage figures for the ten months' period aggregate 387,204 tons for the first ten months of 1920, and 245,033 tons for the first ten months of 1919.

Pig iron imports aggregated 18,391 tons in October, 1919, with a valuation of $852,049, and 23,877 tons in October, 1920, at a valuation of $1,429,809.

Imports of manganese ore and oxide of manganese aggregated 44,700 tons, at a valuation of $948,169 in October, 1920, against 15,863 tons worth $593,945 in October, 1919, and 88,422 tons, worth $1,499,206 in September, 1920. For the ten months' period ending with October, 1920, these manganese imports aggregated 467,712 tons, worth $9,990,799, against 285,274 tons, valued at $9,944,962 for the first ten months of last year.

O. F. S.

Former Steel Company Officials Indicted

The Federal grand jury at Pittsburgh recently returned an indictment against Herbert DuPuy, formerly chairman of the board of directors of the Crucible Steel Co. of America, and George A. Turville, formerly vice-president, secretary and treasurer of the same company, charging them with conspiracy to defraud the Government out of income and excess profits taxes. The Government claims its loss amounts to several millions of dollars. Three counts are contained in the indictment: the concealing of assets of the Crucible Steel Co., making false and fraudulent returns to the Internal Revenue Department and violating chapters of the internal revenue act of Feb. 24, 1919, which deal with the subject of returns to the U. S. Government on incomes subject to excess profits taxes.

Neither Mr. DuPuy nor Mr. Turville now is connected with the Crucible Steel Co. of America.

MACHINERY IN FRANCE

Special Report Discusses Probable Demand for American Equipment

WASHINGTON, Dec. 7.—"Europeans have overestimated their capacity for rehabilitating their industries," declares the summary of a special report on "Industrial Machinery in France and Belgium," written by Trade Commissioner Charles P. Wood for the Department of Commerce.

"American co-operation applied to the reconstitution of essential producing industries would provide a considerable market for American industrial machinery and at the same time would insure raw materials and more work for European machinery factories. More needs to be done to gain the confidence of European industrialists. A basis for credit exists in certain productive industries, conspicuous examples being French beet-sugar mills and hydroelectric development. Methods adaptable to European conditions and the approach to the European purchaser require certain changes from regular practice in the American domestic machinery business. As the value of time becomes more fully realized, American co-operation in France will be more welcome."

Concerning the future of the French steel industry and the possibility that it will adopt American standards of "quantity production," Mr. Wood's report says:

"Although the end of the war found the French iron and steel industries disorganized with respect to peace-time requirements and with many mills demolished and mines in bad condition, the net result of the war will be to increase the production of iron and steel in France. This will be possible because of the recovery of Alsace and Lorraine, and the development and extension of plants for the manufacture of munitions. Since France's gain in this case is Germany's loss, it is necessary to take into consideration the German market and present German manufacturing facilities, in order to arrive at an intelligent conclusion.

Radical Changes Expected

"Such reports as are available indicate that the industry will undergo radical changes in Germany. A consular report from France in 1915 showed that exports of iron ore from France had fallen off 5,000,000 tons, due largely to the complete stoppage of trade with Germany, which formerly was France's best customer for that product. It had been necessary for the French to import coking coal from Germany at the same time that iron ore was exported to Germany. It is thought that the process will now be reversed, since Alsace and Lorraine are within French boundaries, so that German coal will be brought to the mills and furnaces in Lorraine and much of the ore which formerly went to Germany will remain in France.

"It is clear that France proposes to be one of the greatest iron and steel producing nations. The acquisition of the Lorraine iron-ore basin is estimated to have brought an annual output of 42,000,000 tons of ore. The same estimate allows 17,000,000 tons of ore available for export, and predicts that this figure will soon be increased to 25,000,000 tons, stating also that France will have a surplus of 2,000,000 tons of steel for exporting purposes.

What Will France Do?

"There is no question about the war's having increased French capacity for production, but there is a question about what France will do to compete with America and British practice. The criticism of French practice has been that there is a lack of standardization in the system whereunder a mill would undertake to manufacture a variety of products. Granting the excellent quality of these products, it is known that such a mill cannot compete in production cost with other mills that obtain a greater rate of production at decreased unit cost by sacrificing variety to standardization. It is thought that some of the new mills taken over with Lorraine will show better results than other mills which have adhered to French practice. If France is to carry out its program to take advantage of its increased facilities in this industry, it will have to sacrifice much of the well-known French preference for a variety of highly finished products and devote itself to 'smashing out tonnage,' according to American standards of operation.

"Whether this new era in the French iron and steel industry will create an increased market for equipment made in the United States cannot be stated with assurance at the present time. It is thought that there will not be any unusual demand, but that American rolling-mill machinery manufacturers, who are familiar with French practice and are therefore in a position to take up intelligently such inquiries as may be received, may expect to make occasional sales. Ocean freights are a considerable item on heavy mill equipment, so that the Frenchman who could possibly arrange to have the same equipment made in Europe would not be likely to have sufficient inducement offered to him in the United States, except in the case of special equipment controlled in America. Some of the larger French mills maintain representatives in the United States to study American methods, and there are regular purchasers of certain American equipment. Besides the leading American steel-mill builders have had representatives in France and have kept informed as to opportunities in their respective lines."

Production of Pig Iron and Steel in France

WASHINGTON, Dec. 7.—Figures as to the production of French steel and pig iron for the first nine months of 1920 have been forwarded by Consul E. L. Ives, Paris.

"The production of pig iron during the first nine months of 1920 has shown a steady increase, from 195,116 metric tons (metric ton 2204 lb.) in January to 347,451 metric tons in September.

"The monthly production of pig iron in metric tons, as estimated by the Comité des Forges de France (provisional figures), is as follows: January, 195,116; February, 205,227; March, 198,445; April, 179,464; May, 223,510; June, 270,756; July, 299,980; August, 321,293; September, 347,451.

"The production of raw steel (ingots and castings) during September, 1920, shows an increase over the amount produced in January of 104,471 metric tons.

"The tonnage production of raw steel (ingots and castings) in metric tons during the first nine months of 1920, as estimated by the Comité des Forges de France (provisional figures), is as follows: January, 195,404; February, 194,067; March, 188,081; April, 186,025; May, 172,155; June, 244,267 July, 254,725; August, 276,595; September, 299,875."

Spanish Tariff Advances

WASHINGTON, Dec. 7.—Rates of import duty on "luxuries" have been increased by the Spanish Government, effective Dec. 1, according to a cablegram from W. M. Strachan, at Madrid. The increases range from 150 to 300 per cent.

Included in the commodities subject to an increase of 300 per cent are clasps, hooks, chains, etc., of iron or steel for personal use; velocipedes, bicycles and motorcycles; chassis of iron or steel for ordinary road carriages, with or without motor, and automobiles.

Pipe for Scotland

WASHINGTON, Dec. 7.—A cable from Consul A. H. Johnson stated that the Dundee, Scotland, municipality has asked for tenders for 430 tons of cast iron water pipe, 2, 3, 4 and 6 in. in diameter, turned and forejoined. The offers are to be submitted to the town clerk, Dundee, Scotland, by Dec. 11, but the time has been extended for American firms beyond this date.

The mill for hot strip rolling, which has been contemplated by the Worcester Pressed Steel Co., Worcester, Mass., has been postponed until next spring.

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ESTABLISHED 1855

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The Return of Activity in Steel

Widely variant predictions are made as to the time of renewed activity in the steel trade. In a period of depression or stagnation it behooves producers, distributers and consumers to do certain things in preparation for the succeeding period of revival and it would be well to know how much time is to be afforded.

The first requisite in an attempt to reach a fair judgment is to differentiate present conditions from those that have existed in the past when it became necessary for the country to go through a process of readjustment. There are several differences. Some elements formerly present are absent now, and some elements are present now that were unknown in the past.

In the past, when liquidation became necessary, there was an over-supply of steel and of steel products. The material had to be worked off, and the process necessarily took time when consumption was at a reduced rate. It is inconceivable that at present there are stocks of comparable volume. There has been such a scarcity that stocks could not accumulate. Retail hardware dealers, for illustration, are only now receiving some classes of goods of which their stocks have been far below normal. In this respect the readjustment will require less time than the normal of the past.

Usually there has been an excess of building, and the country must pause until its requirements catch up. Now, we have a great deficiency, whether in railroads, dwelling houses or hotel and office structures. In this respect also the usual time for recovery is shortened.

In some of the past periods of readjustment credits were greatly impaired, and time was required for the restoration of credit. In this case such an element is practically lacking. The credit of the vast majority of our banking and commercial institutions is absolutely unimpaired. Those who have been conducting speculative operations are having a hard time of it, but the line is plainly drawn between them and those who are engaged in manufacturing, in regular merchandising and in ordinary banking.

In respect of these three things less time than usual will be required for readjustment. On the other hand are things that have to be done that have not been needed in the past. There is the indisposition on the part of many to work hard and to work intelligently. There is an indifference to the making of mistakes that is really appalling when compared with pre-war mental attitudes. Many men do not admit that it is necessary to work hard or, what is still worse, they may call something hard work that is not. For the correction of these things some painful experiences requiring time, in all probability, will be necessary.

A widespread reduction in costs is necessary. In 1908 the steel industry languished, again in 1911 and again in the twelve-month before the war. In none of those periods was the waiting needed for a reduction in the cost either of producing steel or of consuming steel. As to a reduction in costs, some reduction can occur in three months, more in six months, more in one year and more in the next year. The experience of the industrial depression from 1893 to 1898 is conclusive. There was a continued reduction during those five or six years. Selling prices were lower, and profits larger, in 1898 than in 1894. There is no bottom to costs, hence no particular period of time can be assigned as requisite in the present case.

What is particularly in evidence in the present readjustment is a shaking out in prices of all sorts of commodities. In any given commodity the shaking out could be done in a short time if the commodity stood by itself. What is one man's finished product is another's raw material, and broadly speaking the chain never ends, but returns to itself. Accordingly there cannot be a complete shake-out in any period of time, for there would be simply a downward spiral, just as not long ago we had the ascending spiral.

To sum up, certain readjustments of past periods of depression that required time for completion are not needed now, while the readjustments that are needed to-day are theoretically unending, cannot be pursued to their end because they have none, and hence will not be pursued indefinitely. We may be able to resume work, therefore, and

on an intelligent and safe basis, in a shorter time than many now seem to think is probable.

The Three-Shift Day at Steel Works

The steel industry should not fear a fair presentation of the facts concerning the two-shift system in continuous operations at blast furnaces and steel works. In sharp contrast with the method of attack adopted by the Interchurch World Movement in its report on steel works conditions, is the spirit of another investigation, of which the findings are given on other pages. Horace B. Drury, who made the inquiry into the results secured under the three-shift system at various blast furnaces and steel works in the United States, has aimed to state fairly the position of manufacturers who continue to work on the two-shift plan. That is the impression one carries away from the reading of his detailed report, which was the basis of his address before the Taylor Society and other engineering bodies in New York last week. Mr. Drury found very substantial basis, apart from the capitalistic self-interest against which a railing accusation is usually brought, for the continuance of the 12-hour shift at the majority of steel plants in the United States. After reading his conclusions as to the advantages the management may realize from the three-shift day, an onlooker might even be moved to wonder on which side the propaganda was working, concerning which a charge was made at the meeting which Mr. Drury addressed!

Reserving for another time further comment on the facts brought out by this highly interesting investigation, we call attention to the diversity of conditions attending the working of the three-shift plan by various steel companies, all tending to bear out what has been urged many times as to the complexity of the question. Operating men in the industry will not hesitate to say that, with all the allowance he makes for the difficulties that must be overcome in putting steel plants on a three-shift basis, Mr. Drury's report still takes too favorable a view of the results from the standpoint of cost to the company and of amount and quality of product. From the standpoint of working morale, of citizenship and of what is demanded by present-day standards in industry, the question of the continuance of the long day in the steel industry is getting more open-minded and reasoned consideration from manufacturers than it has ever had before. At no time have the conditions within and without the industry been more opportune for trying out the three-shift system and developing its best possibilities.

Large Steel Exports

The iron and steel export statistics of the United States and Great Britain for October are summarized on other pages. From this country there was the surprising movement of 452,015 gross tons, or the largest for any month this year with the exception of July. No month in 1919 had a larger showing except June. October is the sixth consecutive month to exceed 400,000 tons and the average for the six months, May to October inclusive, is 429,105 tons per month. A significant comparison is found in the fact that British steel exports at their best, after many years of cultivation, were not so large, having averaged but 420,757 tons per month in 1913.

The October increases over the September shipments from this country were notably in steel rails, steel plates, tin plates and barb wire. While the British steel exports in October were low at 277,183 gross tons, the surprise is in the imports, which rose to 188,875 tons. This is not only a high record for this year but is very close to the imports of 1913, which were 195,264 tons per month. The October imports are the largest for any month since 1913, a very considerable amount being from the United States. Taken together the figures show again that the trend of the world's buying of iron and steel is still in favor of the United States. Exchange and credit conditions have made a very considerable change in the export situation since October and these difficulties are likely to continue for some months.

Pig Iron and Steel Capacities

The recurrent suggestion in trade circles, occasionally finding its way into print, that we are short of blast furnace capacity as compared with steel making capacity, does not represent majority opinion, but is encountered often enough to make it worth while to point out its incorrectness.

The misconception arises from neglect of two factors, the failure of the iron foundry to grow at the same pace as the steel works, and the gain of open-hearth steel over Bessemer.

Taking 1907 as a convenient year for comparison with 1919, there was an increase in pig iron production last year of 20.3 per cent (25,781,361 tons to 31,015,364 tons), while there was an increase of 48.4 per cent in the production of steel ingots and castings (23,362,594 tons to 34,671,232 tons). This was in production, not capacity, and in 1919 pig iron was no scarcer than steel, despite its smaller increase in supply. While, however, the production of pig iron increased by only 20.3 per cent, the production of Bessemer and basic irons alone increased by 31.8 per cent, the production of foundry, malleable and forge decreasing by 8.2 per cent. Thus the steel works supply of pig iron increased much more than the total make of pig iron. If the iron foundries had wanted more pig iron in 1919 they could have secured it.

In the production of Bessemer steel the pig iron required is, roughly speaking, about 110 per cent. In making open-hearth steel the amount of pig iron is subject to the dictation of the manufacturer, within the limits of the scrap supply available, and in actual practice the amount is usually between 40 and 80 per cent. If, therefore, a ton of Bessemer steel is supplanted by a ton of open-hearth steel, the amount of pig iron required is proportionately reduced. That supplanting has been in progress.

In 1907 we made substantially the same tonnage of Bessemer steel as of open-hearth steel, about 11,600,000 tons in each case. In 1919 we made nearly four times as much open-hearth as Bessemer. The average quantity of pig iron required per ton of steel made was correspondingly reduced. It used to be thought that with the growth of the open-hearth process the supply of

scrap would run out and the proportion of pig iron would have to be increased greatly, but thus far this difficulty has not been ecountered. The scrap supply is divided chiefly between the open-hearth steel plant, the iron mill and the iron foundry. Noting that the production of foundry and malleable iron decreased from 1907 to 1919 a fair guess is that the consumption of scrap by these foundries decreased also. As to rolled iron, there are statistics showing a decrease from 2,200,-086 tons in 1907 to 1,059,451 tons in 1919. As the total outcome of scrap must have increased, the supply available to open-hearth furnaces increased greatly. The record, indeed, shows that in 1907 the production of basic pig iron was 52.3 per cent of the production of basic open-hearth ingots and castings, while in 1919 the proportion was 56.4 per cent, showing only a very small increase. If the scrap had not been available in 1919 more pig iron would have been called for.

Occasionally the figures of apparent capacity reported by the American Iron and Steel Institute are cited to show that there is a shortage of blast furnace capacity. If the figures given were rightly interpreted they would show an excess of blast furnace capacity. The probability is that there is more optimism on the part of those who report blast furnace capacities to the institute than on the part of those who report steel making capacities. The totals reported for the end of 1919 are 50,222,400 tons in pig iron and 55,637,135 tons in steel ingots and castings. The open-hearth capacity, 42,100,480 tons, would require, at the 56.4 per cent relation that obtained in 1919, 23,300,000 tons of pig iron. The 12,150,280 tons of Bessemer capacity would require, at 110 per cent, 13,350,000 tons. The crucible and electric furnaces might require 750,000 tons; while if the foundry and malleable production of 1919 was 62½ per cent of full requirements there would be about 10,800,000 tons needed in that quarter. Adding 800,000 tons for ferromanganese, spiegeleisen and a factor of safety would make a total of only 49,000,000 tons, or a million tons under the reported capacity.

It should be noted, finally, that it is not natural that a shortage of blast furnace capacity should develop. On the one side, the large ore interests have an incentive to build furnaces, to provide an outlet for their ore. On the other side, the steel works are disposed to build blast furnaces so as to avoid having to melt cold pig iron. Why should it be assumed that the building of blast furnaces has been neglected?

Japan as a Buyer of Steel

A measure of the buying of American steel by Japan in the first four or five months of this year is afforded by the official export statistics for the first nine months. To Oct. 1, this year, total steel exports to that country were 595,816 gross tons as compared with 606,437 tons in all of 1919. These figures cover nine major steel products. The monthly rate to Oct. 1 was therefore 66,202 tons as against 50,536 tons per month in 1919. In wire nails, cast and wrought pipe and fittings, steel plates and sheets, structural steel and wire the exports so far this year exceed those for the entire year 1919. There are no figures on bars.

In pig iron also Japan has been a heavy buyer. To Oct. 1, 1919, the total was 29,907 tons, but to Oct. 1, this year, less than half as much, or 13,448 tons. Japanese purchases of pig iron from Great Britain have increased, however, being 2600 tons per month to Oct. 1, against 2000 tons per month in all of 1919. In copper the situation is similar, heavy exports a year ago and none in September this year.

The falling off in exports to Japan in recent months has been caused by the financial crisis in that country. This is particularly indicated by the September shipments of finished steel, which were only 28,615 tons as compared with the monthly rate of 66,202 tons to Oct. 1. It is likely that for some months to come Japan will be a relatively small factor in our export trade in steel.

CORRESPONDENCE

Transverse Fissures in Rails

To the Editor: I have just read with much interest articles signed O. F. S., pp. 1399 and 1400, THE IRON AGE, entitled, "Wheel Pressures and Steel Rail Failures." The article states: "We are told as the case now stands that there is no known remedy for the prevention of transverse fissures, and if perchance there is one lurking undiscovered in the field of metallurgy it has escaped very diligent search."

The search has not been diligent because the inverted ingot, admittedly the soundest, has had no material trial in rail production and, if anyone says that it has, I am quite sure that I can prove the contrary.

The transverse fissure gives all possible evidence of being an internal rupture, due to the repeated and different stresses set up in the rail in service, beginning at a weak spot as a nucleus and growing under the above-mentioned stress until its extent becomes sufficient to cause rupture or break. The best possible evidence of this is the many failures that occurred in steel parts where the design was copied from a wrought-iron part. These failures continued until engineers learned that the sharp corner was the nucleus at which the failure started, and to-day failures of this kind are rare, but 20 years ago or more, when locomotive designers changed from wrought iron to steel for their driving axles, failure at the end of the keyseat where a sharp corner was left was common, and continued common until the end of the keyseat was rounded, when they disappeared.

The appearance of the break in a transverse fissured rail is exactly the same as one of the old fatigue breaks so common in steel parts having sharp angles before liberal fillets were used, the only difference being that the fatigue break starts on the outside from its sharp corner as a nucleus and under stress eats in, while the transverse fissure starts inside from a blowhole, pipe or slag inclusion as a nucleus, and eats its way out under stress. It takes a comparatively inexpensive test to prove that an internal transverse fissure starts in a weak internal spot in the rail, and tests are now being proposed to one of our leading railroads to prove that this is the case.

When this has been proven we will have gone a long way toward the elimination of this dangerous flaw, for engineers and metallurgists can then devote their time, brains and effort toward eliminating a known and proven cause, instead of spending the same time, brains and effort in argument as to what the cause is. Tremendous steps toward soundness and homogeneity in

many steel products have been made in the past few years, though I am sorry to say that rails are not one of these many products, and should we be able to prove that the transverse fissure in rails has its beginning in an internal nucleus due to lack of soundness or homogeneity, the steps to take toward its elimination are too well known to be open to argument.

GEORGE A. DORNIN,
Consulting Engineer.

BALTIMORE, MD., Nov. 29.

Lettergram Displacing Night Letter

To the Editor: We note an article in your paper about a "Steelogram" of Victor E. Karminski & Co. [Dec. 2, p. 1481].

The writer designed and we have been using a "Lettergram" and envelope, per samples enclosed, for about a year. [The "Lettergram" is printed with blue ink on yellow half sheets of paper and resembles a telegram. Beside the name, address and telephone numbers of the company there are three boxes extending across the page under the heading and marked "Recorder's Sign," "Time Filed" and "Date." The envelope is headed "Lettergram" in large type, with the address of the company smaller.]

Instead of sending night letters by telegram to points reached from here by mail the next morning, we use our "Lettergram" and send same by special delivery, effecting quite a saving without losing any benefit.

Yours truly,
G. B. WICKERSHAM,
Secretary and Treasurer,
Muncie Steel Supply Co.

Muncie, Ind., Dec. 3.

MECHANICAL ENGINEERS MEET

Six Honorary Memberships Conferred—President Miller Discusses Industrial Relations

The annual meeting of the American Society of Mechanical Engineers is being held in New York this week. The first sessions, three simultaneous technical ones, occupied the afternoon of Tuesday, Dec. 7. The first formal session came Tuesday evening when the annual presidential address was delivered by Fred J. Miller, who devoted himself to the engineer in industrial relations, and when six honorary memberships were conferred. The first general session, for business purposes, was scheduled for Wednesday morning, to be followed through Friday by probably twenty different technical and group gatherings.

The recipients of honorary membership were the following:

Capt. Robert W. Hunt, who was president of the society in 1891 and whose conspicuous activity in the iron and steel industry and whose inventions in processes and machinery in that field need no recital here;

Dr. Samuel M. Vauclain, since 1883 with the Baldwin Locomotive Works and actively engaged in the period of the war with the War Industries Board;

Sir Charles Algernon Parsons, of London, England, best known for his developing the steam turbine commercially;

Rear Admiral R. S. Griffin, appointed chief of the Bureau of Engineering of the Navy in 1913 and made rear admiral in 1916, whose contribution to the winning of the war covered improvements in gun fire control of naval vessels and submarine detection;

Commandatore Pio Perrone, president of Gio. Ansaldo & Co., Genoa, Italy, who without a single order from his Government had nevertheless completed 2000 guns which became immediately available after the Caparetto disaster, stopping the advance of the Austrians;

Lord William Weir of G. & S. Weir, Ltd., the Holm Foundry, Cathcart, Glasgow, Scotland, who was the British director general of aircraft production and was knighted in 1917 for his conspicuous service in the manufacture of war munitions for Great Britain.

What Major Miller had to say was in part as follows: "The engineer must increase the effectiveness of labor not by driving or oppression but by the application of brains in industrial organization and management of men as well as of materials. We have been hearing a great deal about a falling off in production per man-hour and there has been a good deal of that, but the fact is that too many of our industrial establishments have been conducted upon the hire, drive and fire plan.

"Successful industrial management has been declared to be, more than anything else, a state of mind. The various systems we are now hearing so much about vary greatly in their capacity to help in arriving at good conditions, but under the best of them there must be a foundation consisting of a determination to be fair, considerate and entirely candid and above-board, or they will be of little use."

Sheet Metal Manufacturers Meet

CHICAGO, Dec. 7.—Sixty members of the National Association of Sheet Metal Products Manufacturers met in a two-days' convention at the LaSalle Hotel, Chicago, Dec. 6 and 7. Much of the time was given to a discussion of ways and means of enlarging the membership and strengthening the organization. Each delegate was pledged to bring at least one new member into the association this year.

The United States Chamber of Commerce complimented the association on its accomplishments along the lines of standardization of list prices and of products. There was favorable discussion of a plan to adopt a uniform trade mark, but no action was taken.

It was the consensus of opinion that the business outlook is good and that within four months manufacturers and contractors will be operating practically at capacity.

Officers were re-elected as follows: President, M. B. Armstrong, Thomas & Armstrong Co., London, Ohio; treasurer, E. E. Placek, Nebraska Culvert & Mfg. Co., Wahoo, Neb.; secretary, D. C. Jones, St. Paul, Minn.; first vice-president, R. Hardesty, R. Hardesty Mfg. Co., Denver; second vice-president, F. L. Nelson, O. K. Harry Steel Works, St. Louis; third vice-president, E. E. Wild, Columbia Steel Tank Co., Kansas City, Mo.

The Iron Age and Its Readers

With the first issue of July we began the printing of a displayed table of contents. We have ample evidence that this has helped our readers to get maximum value out of the week's contributions. The full page reserved for this purpose appears immediately preceding the editorials, but that its location may be ascertained the more readily the number of the page will be given hereafter at the upper right corner of the front cover of each issue.

The marking of the page in this way is the result of a number of requests for it. That changes may be brought about through reader suggestion is gratifying proof that subscribers want more than an impersonal relation with the editor and publisher and seek the co-operation to which they are entitled.

The St. Louis Coke & Chemical Co., Granite City, Ill., expects to start its battery of Roberts-type by-product coke ovens early in January. Two batteries of 40 ovens each are under construction which are designed to produce metallurgical coke from 100 per cent Illinois coal. A 500-ton blast furnace is also practically completed and will be blown in at an early date.

LOWER PIG IRON OUTPUT

November Daily Rate 8382 Tons Less Than in October

Net Loss of 33 Furnaces—Output Next to Lowest for the Year

The slowing down in the blast furnace industry, which started late in October, was further accentuated in November. The net loss in furnaces was practically equal to that in October, making the total net loss for the two months 67 furnaces. The output for November is next to the lowest for the year, that in April having been cut down by the railroad strike.

The production of coke and anthracite blast furnaces in November, a 30-day month, amounted to 2,934,908 gross tons or an average of 97,830 tons per day as compared with 3,292,597 tons, or an average of 106,212 tons per day, according to revised data, in October, a 31-day month and with 3,129,323 tons or an average of 104,310 tons per day in September, a 30-day month. The April output, the lowest for the year, was 2,739,797 tons, or 91,327 tons per day. The average daily production in May, however, was 96,312 tons per day. There was a net loss of 33 furnaces, the total in blast on Dec. 1 having been 252 as compared with 285 on Nov. 1. Revised data for October showed 285 furnaces in blast on Nov. 1, a net loss of 34. In November there were 11 furnaces blown in and 44 blown out.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from October, 1919, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
November	57,589	22,156	79,745
December	61,815	23,129	84,944
January, 1920	72,015	25,249	97,264
February	75,230	27,490	102,720
March	80,021	28,879	108,900
April	65,168	26,159	91,327
May	68,668	27,644	96,312
June	73,659	27,792	101,451
July	71,954	26,983	98,937
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830

The figures for daily average production, beginning with January, 1914, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1914—Gross Tons

	1914	1915	1916	1917	1918	1919	1920
Jan.	60,808	51,659	102,746	101,643	77,799	106,525	97,264
Feb.	67,453	59,813	106,456	94,473	82,835	105,006	102,720
Mar.	75,738	66,575	107,667	104,882	103,648	99,685	108,900
Apr.	75,655	70,550	107,592	111,165	109,607	82,607	91,327
May	67,506	73,015	108,422	110,238	111,175	68,002	96,312
June	63,916	79,361	107,053	109,002	110,793	70,495	101,451
July	63,150	82,691	104,017	107,820	110,354	78,340	98,931
Aug.	64,363	89,666	103,346	104,772	109,341	88,496	101,529
Sept.	62,753	95,085	106,745	104,465	113,942	82,932	104,310
Oct.	57,361	100,822	113,189	106,550	112,482	60,115	106,212
Nov.	50,611	101,244	110,394	106,859	111,802	79,745	97,830
Dec.	48,896	103,333	102,537	92,997	110,762	84,944	.....

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total production			Spiegeleisen and ferromanganese		
	1918	1919	1920	1918	1919	1920
Jan.	1,756,208	2,430,022	2,232,455	30,695	32,787	23,957
Feb.	1,620,254	2,209,470	2,181,679	26,114	28,105	28,038
Mar.	2,349,419	2,277,507	2,480,668	39,122	26,644	35,275
Apr.	2,411,488	1,838,677	1,968,542	35,511	17,308	27,628
May	2,513,577	1,586,805	2,128,720	54,633	14,604	33,407
June	2,407,166	1,655,944	2,209,770	44,844	14,254	34,751
July	2,456,693	1,906,604	2,230,567	51,762	14,805	36,789
Aug.	2,509,357	2,108,566	2,254,943	54,009	17,419	36,985
Sept.	2,507,381	1,828,613	2,247,250	66,275	20,631	39,546
Oct.	2,594,277	1,295,690	2,393,644	70,379	20,238	34,786
Nov.	2,501,867	1,727,656	2,150,075	59,638	19,964	26,944
Dec.	2,524,794	1,916,249	.....	49,435	15,718	.....

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for October, and the three months preceding:

Pig Iron Production by Districts—Gross Tons

	Nov. (31 days)	Oct. (31days)	Sept. (30 days)	Aug. (31 days)
New York	213,895	239,953	233,534	223,091
New Jersey	9,418	8,431	9,153	8,029
Lehigh Valley	83,539	109,875	100,309	96,310
Schuylkill Valley	82,002	102,863	89,498	83,143
Lower Susquehanna and Lebanon Valleys	66,535	85,821	80,862	67,840
Pittsburgh district	587,073	651,746	651,348	655,191
Shenango Valley	111,211	121,513	121,830	108,949
Western Penna.	110,240	164,071	156,155	183,125
Maryland, Virginia and Kentucky	97,151	112,663	110,097	102,785
Wheeling district	136,589	138,797	126,610	123,047
Mahoning Valley	293,353	313,355	281,785	304,482
Central and Northern Ohio	290,224	301,182	285,842	311,310
Southern Ohio	53,057	64,995	70,042	61,877
Chicago district	484,841	520,253	472,762	462,550
Mich., Minn., Mo., Wis., Colo., and Wash.	135,956	141,015	117,011	118,127
Alabama	169,760	198,353	197,532	212,946
Tennessee	10,064	17,711	24,953	24,600
Total	2,934,908	3,292,597	3,129,323	3,147,402

Capacities in Blast Dec. 1

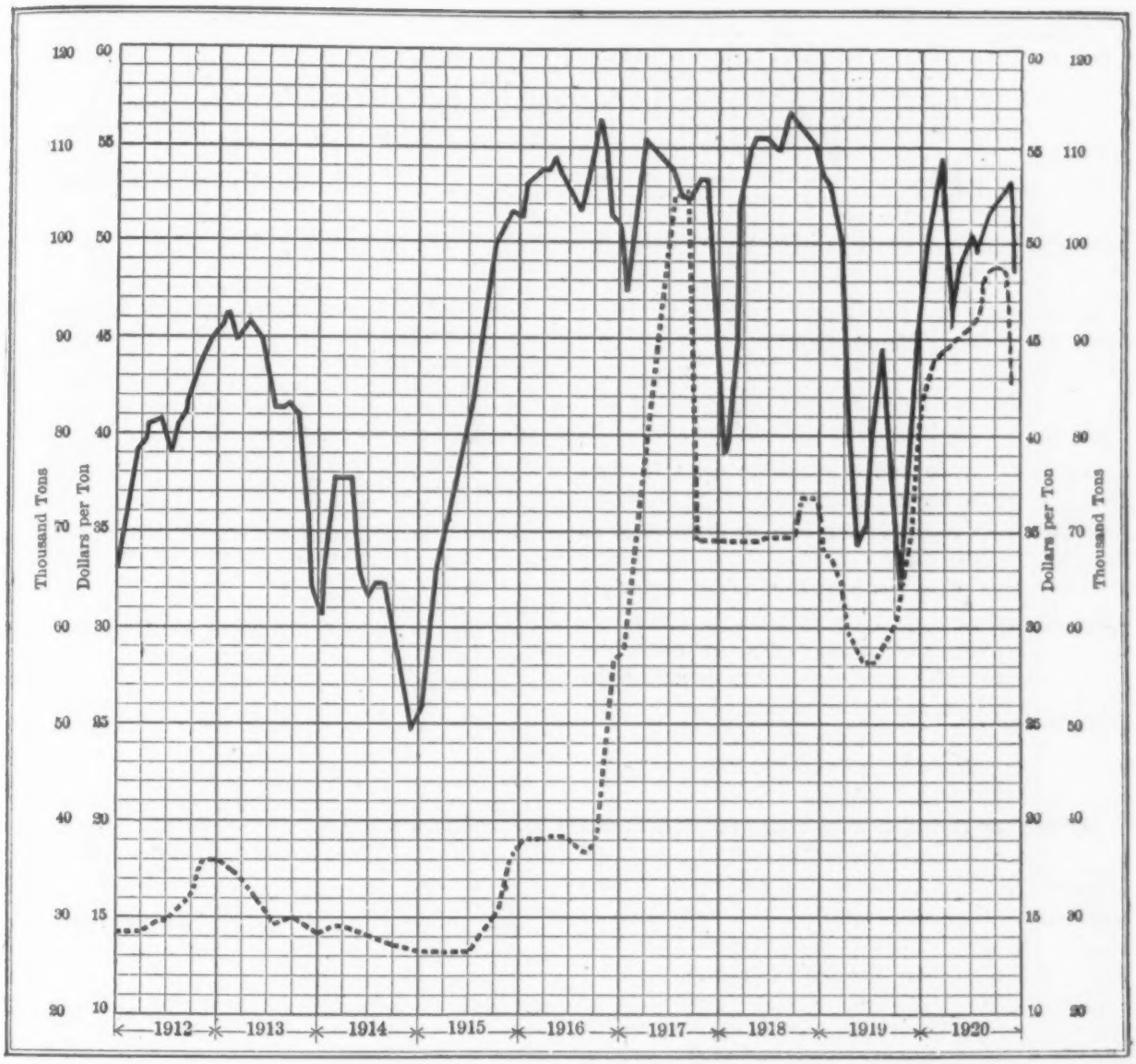
The following table shows the number of furnaces in blast Dec. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Nov. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Dec. 1: In Blast	Dec. 1: Capacity Per Day	Nov. 1: In Blast	Nov. 1: Capacity Per Day
New York:					
Buffalo	22	14	4,940	18	6,425
Other New York	4	3	715	3	650
New Jersey	4	2	310	2	270
Pennsylvania:					
Lehigh Valley	18	10	1,600	13	2,950
Spiegel	2	1	90	1	75
Schuylkill Valley	14	8	2,510	12	3,300
Lower Susquehanna	8	3	1,300	4	1,700
Ferro	2	2	135	2	145
Lebanon Valley	7	2	300	5	700
Ferro and Spiegel	3	3	130	2	135
Pittsburgh District	56	39	17,700	41	18,000
Ferro and Spiegel	3	3	325	3	450
Shenango Valley	19	9	3,175	11	3,560
Western Penn.	25	15	3,600	14	4,000
Ferro and Spiegel	1	1	80	1	65
Maryland	6	2	800	5	1,410
Wheeling District	15	12	4,600	12	4,470
Ohio:					
Mahoning Valley	27	21	9,685	22	9,700
Central and North.	26	22	9,300	23	9,715
Southern	16	6	1,860	6	1,570
Illinois and Indiana	40	29	14,900	32	16,100
Ferro	1	..	...	1	75
Mich., Wis. and Minn.	11	8	2,935	9	3,310
Col., Mo. and Wash.	6	5	1,510	4	1,230
The South:					
Virginia	16	8	935	8	1,030
Ferro	1	..	...	1	60
Kentucky	7	2	305	3	465
Alabama	40	19	5,220	23	6,140
Tennessee	16	3	280	4	380
Total	416	252	89,240	285	98,080

The furnaces blown in include two Isabella furnaces of the Carnegie Steel Co. and one Monongahela of the National Tube Co. in the Pittsburgh district; Newcastle No. 1 furnace of the Carnegie Steel Co. in the Shenango Valley; one Johnstown furnace of the Cambria Steel Co. in western Pennsylvania; one Bellaire furnace of the Carnegie Steel Co. in the Wheeling district; one Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; one furnace of the National Tube Co. in northern Ohio; the Marting furnace of the Marting Iron & Steel Co. in southern Ohio; B furnace of the Colorado Fuel & Iron Co. in Colorado, and No. 3 Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Among the furnaces blown out or banked are No. 3 and No. 7 furnaces of the Lackawanna Steel Co., B furnace and No. 1 furnace of the Donner Steel Co. at Buffalo; two furnaces of the Bethlehem Steel Co. and one Lock Ridge furnace of the Thomas Iron Co. in the Lehigh Valley; the Keystone furnace, the Temple fur-



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

nace and two Worth furnaces in the Schuylkill Valley; one Steelton furnace and one Colebrook of the Bethlehem Steel Co. and the Lebanon Valley Furnace in the lower Susquehanna and Lebanon Valley district; one Carry furnace, two furnaces of the Jones & Laughlin Steel Co., one Midland furnace of the Pittsburgh Crucible Steel Co. and one Monessen furnace of the Pittsburgh Steel Co. in the Pittsburgh district; the Alice, Claire and one Shenango furnace in the Shenango Valley; the Max Meadows furnace of the Virginia Iron, Coal & Coke Co. in Virginia; three furnaces of the Bethlehem Steel Co. in Maryland, and one Ashland furnace in Kentucky; the Belmont furnace of the Wheeling Steel & Iron Co. in the Wheeling district; the Hanna furnace of the Republic Iron & Steel Co. and the Mary furnace in the Mahoning Valley; the United furnace and one River furnace in northern Ohio; Milton furnace in southern Ohio; one Federal furnace and three Iroquois furnaces in Illinois; one Detroit furnace in Michigan; No. 6 Ensley furnace of the Tennessee Coal, Iron & Railroad Co., the Woodstock furnace and three furnaces of the Woodward Iron Co. in Alabama, and the Cumberland furnace in Tennessee.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1910 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920
Jan....	3,185,121	3,150,938	2,411,768	3,302,260	3,015,181
Feb....	3,087,212	2,645,247	2,319,299	2,940,168	2,978,879
Mar....	3,337,691	3,251,352	3,213,091	3,090,243	3,375,907
Apr....	3,227,768	3,334,960	3,288,211	2,478,218	2,739,797
May....	3,361,073	3,417,340	3,446,412	2,108,056	2,985,682
June....	3,211,588	3,270,055	3,323,791	2,114,863	3,043,540
July....	3,224,513	3,342,438	3,420,988	2,428,541	3,067,043
Aug....	3,203,713	3,247,947	3,389,585	2,743,388	3,147,402
Sept....	3,202,366	3,133,954	3,418,270	2,487,965	3,129,323
Oct....	3,508,849	3,303,038	3,486,941	1,863,558	3,292,597
Nov....	3,311,811	3,205,794	3,354,074	2,392,350	2,934,908
11 mos.	35,861,705	35,303,063	35,072,430	27,949,610	33,710,259
Dec....	3,178,651	2,882,918	3,433,617	2,633,268	.....
Total, yr.*	39,039,356	38,185,981	38,506,047	30,582,878	.....

*These totals do not include charcoal pig iron. The 1918 production of this iron was 347,224 tons.

The December meeting of the Cincinnati Chapter of the American Society for Steel Treating will be held in Hall D, Odd Fellows Temple, on Friday evening, Dec. 10. Papers will be read by W. L. Fleming, metallurgist of the Andrews Steel Co., on "The Effect of the Element Carbon on Steel," and Dr. J. C. Hartzell, of the Victor Safe & Lock Co., on "Furnaces and Fuels," with special emphasis on conversion from gas to oil.

Iron and Steel Markets

PRICES AND OUTPUT FALL

Net Loss of 33 Blast Furnaces in November

Pig Iron Decline More Marked—Scarcity of Bar Business Phenomenal

The steel trade had expected to drift through December with buying at the lowest rate of the year and the dropping of prices in practically all lines to the Steel Corporation level makes scarcely a ripple. One effect has been to check cancellations and suspensions through a revision of some contracts with independent mills to the new basis.

Adjustment of operations to the curtailed demand goes on both at blast furnaces and steel works. Pig iron output in November was 2,934,908 tons, or 97,830 tons a day, as against 3,292,597 tons in October, or 106,212 tons a day.

Forty-four furnaces were blown out last month and 11 went in, making a net loss of 33, or a total of 67 since Oct. 1. More are scheduled to stop soon. Active capacity on Dec. 1 is estimated at 89,240 tons a day for 252 furnaces; on Nov. 1 it was 98,080 tons a day for 285 furnaces.

Production of pig iron is now at the rate of about 31,750,000 tons a year, or 80 per cent of the high 1920 rate of March—less of a falling off than is indicated by the flatness of some steel works' order books.

Several cases of the complete shutting down of steel works are known this week, showing that many consumers, with no work ahead, with one accord have shut off shipments of steel. Two Eastern plate mills are idle, as are two steel plants in northern Ohio. Another at Cleveland is on the verge of closing down.

With all the promise of rail business for 1921 the railroad equipment market gives no like sign. Railroads consider car prices high, even on the Steel Corporation basis for steel, and talk of forcing a lower level.

Eastern rail orders just published are chiefly for amounts reserved some months ago. Of the B. & O. total of 85,000 tons, more than was expected goes to the Steel Corporation. Two independent companies get small tonnages, presumably at $57. On the Pennsylvania tonnage of 150,000 and a like total for the New York Central Lines and Pittsburgh & Lake Erie, the extras for the heaviest sections will be higher than the $3.80 heretofore charged.

In some products the Steel Corporation is making considerable inroads upon its unfilled orders. The Carnegie Steel Co. has been operating at 90 per cent of steel works and finishing capacity and 46 out of 59 of its blast furnaces are going.

The scarcity of business in bars is almost unprecedented. Usually when all other lines are flat, bars can be sold. To-day inventories are being stripped of every possible ton.

Bolt, nut and rivet makers are now down to the level of prices adopted in early 1919, based on 2.35c. bars.

Some promise of increased building activity is given by the release of 18,000 tons for a large bank and office building in Cleveland and by structural steel lettings in the East totaling close to 8000 tons.

The unexpected appearance of a considerable tonnage of pig iron offered by a new Detroit furnace for sale at several dollars per ton lower than any of the recent low quotations along the Lakes has caused a stir in a very dull market. It is reported that the Detroit company is willing to sell 10,000 tons as low as $30, furnace, for No. 2 foundry. Basic has developed greater weakness in eastern Pennsylvania, where a sale of about 1000 tons has been made to an Eastern plate maker at about $35, delivered, or fully $3 below recent quotations. In the Chicago district, some furnaces are disposed to meet late prices on resale iron and the leading Northern merchant in that district has dropped its quotations on No. 2 foundry from $46, Chicago, to $38. The possibility of reducing excess profits taxes by selling pig iron at low prices has become a factor in the situation.

Scrap prices are falling; in some grades the week's reductions have been $2 to $4 per ton.

Further price reductions in Great Britain are regarded as inevitable after a gradual melting away for some weeks. Steel bars in Europe are selling at $47.50 per ton and beams at $54.50, with British prices held at $91.70 and $83, respectively. German billets have sold at $45, delivered, in England, and the British price is $53.60.

An ominous development is an expected total stoppage within two months of the Welsh tin plate trade. The market is crumbling, with $6.40 now done per base box for prompt shipment. German tin plate has sold for Egypt at $6.05. The Pittsburgh price is $7.

At 452,000 tons, iron and steel exports in October were the largest for the year, save in July. But current export orders are less than one-fifth of the year's average, with exchange conditions growing worse rather than better.

Pittsburgh

PITTSBURGH, Dec. 7.

Broadly, the response on the part of buyers to the recent price reductions by independent companies has been feeble and disappointing and it is becoming evident that consumers at the moment are more interested in their inventories and tax statements than in the prices at which they can secure new tonnages. One large independent in the past week has taken about 10,000 tons of new business in plates, shapes and bars at the Steel Corporation bases and it is intimated that at least a portion of this tonnage was from Corporation customers unable to secure delivery as promptly as desired from the Corporation. In the minor steel products such as strips, nuts, bolts and rivets, and cold-finished steel bars, prices of which have been revised downward in keeping with the lower independent prices

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 7, 1920	Nov. 30, 1920	Nov. 9, 1920	Dec. 9, 1919
No. 2X, Philadelphia‡	*$37.79*	$40.79	$47.79	$40.10
No. 2, Valley furnace†	*37.00*	38.00	41.00	36.00
No. 2 Southern, Cin'ti†	42.50	42.50	42.50	38.60
No. 2, Birmingham, Ala.†	38.00	38.00	38.00	35.00
No. 2, foundry, Chicago*	*36.00*	37.00	40.00	40.00
Basic, del'd, eastern Pa.	*35.00*	38.46	44.46	35.00
Basic, Valley furnace	33.00	33.00	38.50	34.00
Bessemer, Pittsburgh	36.96	36.96	43.96	36.40
Malleable, Chicago*	*36.50*	37.50	40.50	40.50
Malleable, Valley	37.00	37.00	42.00	35.00
Gray forge, Pittsburgh	*37.96*	38.96	41.96	36.40
L. S. charcoal, Chicago	51.00	51.00	53.50	42.50
Ferromanganese, Atl. port	*110.00*	125.00	150.00	110.00
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$55.00	$55.00	$55.00	$45.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	47.00
Bess. billets, Pittsburgh	43.50	43.50	50.00	45.00
O.-h. billets, Pittsburgh	43.50	43.50	50.00	45.00
O.-h. sheet bars, P'gh	47.00	47.00	60.00	48.00
Forging billets, base, P'gh.	56.00	56.00	60.00	60.00
O.-h. billets, Phila	*49.24*	55.74	60.74	54.00
Wire rods, Pittsburgh	57.00	57.00	70.00	60.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	4.35	4.35	4.85	3.245
Iron bars, Pittsburgh	3.63	3.63	4.50	3.25
Iron bars, Chicago	*3.25*	3.75	3.75	2.77
Steel bars, Pittsburgh	2.35	2.35	3.00	2.75
Steel bars, New York	2.73	2.73	3.38	3.12
Tank plates, Pittsburgh	2.65	2.65	2.85	2.65
Tank plates, New York	3.03	3.03	3.38	2.92
Beams, etc., Pittsburgh	2.45	2.45	3.00	2.45
Beams, etc., New York	2.83	2.83	3.38	2.72
Skelp, grooved steel, P'gh.	3.00	3.00	3.25	2.45
Skelp, sheared steel, P'gh.	3.00	3.00	3.50	2.65
Steel hoops, Pittsburgh	3.05	3.05	4.50	3.25

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Dec. 7, 1920 Cents	Nov. 30, 1920 Cents	Nov. 9, 1920 Cents	Dec. 9, 1919 Cents
Sheets, black, No. 28, P'gh.	*4.35*	4.85	6.00	4.35
Sheets, galv., No. 28, P'gh.	*5.70*	6.00	7.50	5.70
Sheets, blue an'l'd, 9 & 10.	*3.55*	3.90	4.75	3.55
Wire nails, Pittsburgh	3.25	3.25	4.25	4.00
Plain wire, P'gh	3.25	3.25	3.75	3.25
Barbed wire, galv., P'gh.	4.10	4.10	4.45	4.45
Tin plate, 100-lb. box, P'gh.	$7.00	$7.00	$7.50	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$27.00	$27.00	$33.00	$30.00
Carwheels, Philadelphia	*27.00*	30.00	39.00	30.00
Heavy steel scrap, P'gh.	*19.00*	20.00	25.00	24.00
Heavy steel scrap, Phila.	*18.00*	17.00	20.00	22.50
Heavy steel scrap, Ch'go.	*16.50*	17.00	18.50	20.50
No. 1 cast, Pittsburgh	*28.00*	29.00	35.00	30.00
No. 1 cast, Philadelphia	*27.00*	31.00	36.00	30.00
No. 1 cast, Ch'go (net ton)	*18.50*	21.50	22.00	29.50
No. 1 RR. wrot, Phila.	*20.00*	23.00	26.00	30.00
No. 1 RR. wrot, Ch'go (net)	15.50	15.50	16.50	23.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$6.50*	$7.50	$8.00	$6.00
Furnace coke, future	*6.60*	9.00	9.00	6.00
Foundry coke, prompt	*7.50*	8.50	9.00	7.00
Foundry coke, future	*8.50*	10.00	10.00	7.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.00	14.00	15.00	19.00
Electrolytic copper, N. Y.	**14.00**	13.50	15.00	18.50
Spelter, St. Louis	**6.25**	5.60	6.80	8.37½
Spelter, New York	**6.60**	6.00	7.25	8.72½
Lead, St. Louis	*5.00*	5.25	6.50	6.65
Lead, New York	*5.00*	5.25	6.75	6.90
Tin, New York	**35.00**	33.50	37.00	54.00
Antimony (Asiatic), N. Y.	5.75	5.75	6.25	9.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

of the major products, business has shown absolutely no gain and some makers of these lines actually state that demands have declined further. Although the leading independent here is operating at a fairly high rate in its finishing department, it has only about 60 per cent of its steel making capacity in operation and less than half of its blast furnaces blowing. Another Pittsburgh independent which has had its steel works down for about two weeks on account of an accident to the accumulator in its blooming mill is planning to resume to-morrow, but in a general way, if pipe making capacity be excluded, it is safe to say that independent steel company operations in this and nearby districts are on a smaller scale than recently.

Some of the independent steel companies have not gone along in the price reduction by Pittsburgh and Youngstown manufacturers, and it apparently is their intention to complete orders on their books and then shut down. Curtailment by Pittsburgh independents is considered likely during the latter part of this month. The past week has brought no change in the operating rate of any of the Steel Corporation subsidiaries, all of which are now running as full as it is physically possible. Occasionally both the National Tube Co. and the American Sheet & Tin Plate Co. have some capacity idle through lack of sufficient steel, but usually such idleness is only for a day or so. The Carnegie Steel Co. is operating about 90 per cent of its steel making and finishing capacity and has 46 of its 59 blast furnaces blowing. Since the Corporation in its Pittsburgh district plants is able to make full shipments and is getting less business than recently, the belief is held in some quarters that it is making pretty big inroads upon its unfilled tonnages.

Single quotations now are pretty well established on all finished steel products with the exception of pipe and wire nails. Sales of nails at higher than the Corporation base of $3.25 per keg, however, are neither large nor numerous. Practically all independents to-day would take orders for sheets at the Industrial Board quotations so long and rigidly adhered to by the Corporation.

The week has been featured by a recurrence of weakness in the coke market which is down about $1 a ton on spot offerings, due to the fact that about a dozen blast furnaces either have gone down or are getting ready to bank or go out in the next two weeks. The tonnage of coke which has been released is extremely hard to place. Some contracting has been done on furnace coke on a basis of five to one on Valley basic pig iron which on to-day's market for that grade of iron would mean $6.60 for the coke.

Merchant producers of pig iron are showing a tendency to stand on the prices as revised a week ago on the ground that they cannot cut further without taking a loss and the disinclination to make and pile iron at current cost is evident from the large number of stacks which have or will shortly go out.

Lack of demand on the part of melters has forced a further drop in scrap prices.

Pig Iron.—Business still is utterly lacking in this market and prices nominally are unchanged, although it is admitted that if buyers came into the market with desirable tonnages, producers would yield further to secure business. No. 2 foundry is being offered by furnace interests at $37, Valley furnace, or about $1 a ton below the asking price in this market of a week ago. No direct furnace business has been done at this figure, however, and it is merely an asking price.

On resale tonnages, a few of which have been moved lately, $35, Valley furnace, is regarded as typical of the market. It is reported that some of the Valley steel makers have surplus tonnages of basic iron that they would be glad to sell at $30, but this price can hardly be regarded as a market quotation in the absence of sales. No. 1 furnace of the Shenango Furnace Co., Sharpsville, Pa., was blown out Dec. 1, while it is probable that the furnaces of the Clinton Iron & Steel Co., Pittsburgh; the Stewart Iron Co., Sharon, Pa., and of the Kittanning Iron & Steel Mfg. Co., Kittanning, Pa., will be blown out shortly. The Pittsburgh Crucible Steel Co. is understood to be considering the banking of its new furnace, while the furnace of the Penn Iron & Coal Co., Dover, Ohio, will be blown out soon for rebuilding. The Donner Steel Co. has only one of its four furnaces between Buffalo and Tonawanda in blast, having blown one out last Thursday while three other Lake furnaces are mentioned as having gone out or about ready to do so. W. P. Snyder & Co. averages on sales in November from Valley furnaces make the price of basic $37.235, as compared with $42.418 in October, and on Bessemer $39.30 as compared with $47.25 in the previous month.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$33.00
Bessemer	35.00
Gray forge	$34.00 to 36.00
No. 2 foundry	35.00 to 37.00
No. 3 foundry	34.50 to 36.50
Malleable	35.00 to 37.00

Ferroalloys.—Prices generally are lower both on sales and on offerings. We note a resale of 150 tons of 76 to 80 per cent ferromanganese for immediate shipment at $110 delivered, less 1 per cent for cash, equivalent to less than $105 seaboard. Domestic makers are quoting $150 seaboard, and English producers $140, but these prices, though well below recent asking figures, are out of the question at present, as consumers are amply, and in a number of instances, over supplied, and not interested. Spiegeleisen is weak and though nominally quoted at $72 to $75, furnace, by makers, can be bought at less. Resale tonnages are available at around $60, furnace. Ferrosilicon is neglected. The recent cut of $5 per ton by Jackson, Ohio, producers has not stimulated any interest, as much resale tonnage is available at below the new furnace prices. In the lack of sales 50 per cent ferrosilicon is quoted unchanged, but an inquiry probably would bring out a lower price.

We quote 76 to 80 per cent domestic ferromanganese at $150, seaboard; English, $140 on direct sale; resale tonnages $105 to $110 seaboard. We quote average 20 per cent spiegeleisen nominal at $72 to $75 furnace, on direct business and $60 to $65 for resale tonnages; 50 per cent ferrosilicon, nominal, $75 to $80 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces as follows: 9 per cent, $61; 10 per cent, $64.50; 11 per cent, $67.80; 12 per cent, $71.10. Silvery iron, 6 per cent, $51.50; 7 per cent, $53; 8 per cent, $55; 9 per cent, $57; 10 per cent, $59.50; 11 per cent, $62.80; 12 per cent, $66.10. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Plates.—An independent maker reports orders aggregating about 6000 tons since the revision to the March 21, 1919, base. It is said that some of this business came as a result of the inability of the Corporation to deliver as promptly as the steel was wanted. Both of the car building companies here are running light on orders and doing no buying at present. Resale of a substantial tonnage of circular boiler plates is noted at 2c., the original buyer being unable to take the plates on account of cancellations of orders and the mill being without space to stock them.

We quote sheared plates of tank quality ¼ in. and heavier at 2.65c., Pittsburgh, this being the quotation of both the Carnegie Steel Co. and the leading independents.

Billets, Sheet Bars and Slabs.—The decline in finished products having been without material effect upon the demand, interest in semi-finished steel remains negligible and prices are purely conjectural. Buyers do not believe they should pay more than the Steel Corporation prices, since to secure any business in the finished materials they must meet the Corporation figures. Some sheet makers assert that only through purchase of sheet bars at $42, Pittsburgh or Youngstown, can they meet the Corporation sheet schedules. Sheet bars are being offered by some independents at $47, but no business has developed. Reaffirmation by the Corporation of the March 21, 1919, sheet schedules is considered to have restored the Industrial Board sheet bar price of $42. An inquiry for 1000 tons of wide, thick slabs recently put out but not closed brought independent quotations as high as $52 and as low as $46. It is understood that a northern Ohio maker has named $52 on sheet bars and $51 on slabs as the December prices on contracts. Some independents are talking $45 and $46 on 4-in. rerolling billets, but no business has been done at either price.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $43.50 to $46; 2 x 2-in. billets, $45 to $46; Bessemer sheet bars, $47 to $55; open-hearth sheet bars, $47 to $55, and forging billets, ordinary carbons, $56 to $60 base, all f.o.b. Youngstown or Pittsburgh mill.

Structural Material.—While large structural shapes are down to 2.45c. from independent as well as Corporation mills, most of the independents continue to quote small shapes at 3c. We note sales by one independent of about 4000 tons of large shapes at 2.45c., but in general the cut to this figure has not helped business materially. Demands upon the fabricators are few and small, and while investors are making fairly frequent inquiries, awards have been few and have involved unimportant tonnages. Prices are given on page 1583.

Wire Rods.—A single quotation again rules, as leading independents have cut their price to the Corporation base of $57 for ordinary soft rods, $62 for screw stock rods and to $68 to $75 for carbon rods. Demand is light, as non-integrated makers of wire products are waiting a more settled market and the drop in bolts and rivets has checked demand for those purposes. Prices are quoted on page 1583.

Wire Products.—Double quotations on nails still are necessary, as the independent company quoting the Corporation prices claims it is losing $12 to $15 a ton at $3.25 and is taking business only from its regular customers, while the leading interest is not yet anxious for new accounts. The spread on nails, however, is narrower, as one independent which recently was quoting $4 base per keg has dropped to $3.75, the basis of the Pittsburgh Steel Co. All makers are quoting plain wire at $3.25 per 100 lb. base. Several prices are quoted on cement coated nails, but a range of $2.85 to $3.35 covers all companies. Fair demand exists for nails, but wire is slow. The price of woven wire fence has been cut, the new discount being 58 per cent off list in carload lots to jobbers, this discount being quoted by all companies in this district.

We quote wire nails at $3.25 base, the price of the American Steel & Wire Co. and Jones & Laughlin Steel Co., and $3.75, the price of other independents. We quote bright basic and Bessemer wire at $3.25, the price of the American Steel & Wire Co. and independents.

Hot-Rolled and Cold-Rolled Strips.—Effective Dec. 1, and applying against all unfilled business, leading Pittsburgh district makers of hot-rolled and cold-rolled strips have reduced the price to 7c. base for cold-rolled and to 4c. base for hot-rolled. These prices represent a reduction of $20 per ton from prices recently quoted by these companies, but only about $10 per ton from the prices which some makers recently were willing to take business. The American Steel & Wire Co. is quoting cold-rolled strips at 6.25c. base, and the full range therefore is from 6.25c. to 7c. While cancellations have largely stopped, specifications are not being made freely, nor is new business any heavier than it was on the old base.

Spikes.—Lower prices have been named by most of the independent companies in keeping with the decline in independent bar prices to the Corporation levels. Standard prices, 9/16-in. and larger, now are quoted at 3.65c. and small spikes at 5.25c. base. These prices represent a differential over steel bars of 1.30c. per lb., as compared with a former differential of 1c. per lb. Some makers are quoting large spikes at $4, but are booking no new business at this figure, preferring to clean up old obligations before opening their books. Recent inquiries have been few and small and no im-

portant awards have been made. Makers are promising deliveries on large spikes in 30 days and on small spikes in 60 days. Prices are given on page 1583.

Steel Rails.—Fairly good demand is noted for light rails, but buyers are having no difficulty in covering their requirements from independent makers rolling them from new steel at 3c. for 25 to 45-lb. sections. One maker here, however, is quoting 3.25c. on rails of less than 25 lb., which is well above the ordinary extras for the light sections. The announcement of the prices on standard rails for 1921 is awaited with a good deal of interest. Various reports are heard as to the probable price of Steel Corporation, but credence is given the report that present prices will be reaffirmed and that the Corporation will obtain higher prices through new extras.

We quote 25 to 45-lb. sections from 2.45c., the price of the Carnegie Steel Co., to 3c., the price of the independent makers rolling from new steel; 16-lb. and 20-lb. sections are priced 4½c. per 100 lb. higher than the base sizes, 12-lb. and 14-lb. sections 9c. per 100 lb. above base and 8-lb. and 10-lb. sections 13½c. per 100 lb. above base. Standard sections, 50 lb. and heavier, are quoted by the Carnegie Steel Co. at $45 for Bessemer and $47 for open hearth stock and by independent mills from $55 to $65 for Bessemer and $57 to $67 for open-hearth rails.

Boiler Tubes.—Prices named by independent makers of both steel and charcoal iron boiler tubes are extremely irregular, depending largely on the condition of the order books of the different manufacturers. No public announcement of lower prices yet has been made, but one is looked for before another week passes. Most of the independent makers are well caught up on their orders and in need of new ones and small tonnages can be bought at the carload price or less. Discounts are given on page 1583.

Sheets.—While some makers of sheets are disposed to ignore the recent action of several companies in reducing prices to the Industrial Board schedules and to complete such live tonnages as are on their books and then shut down, the more common tendency is to meet the prices recently reaffirmed by the American Sheet & Tin Plate Co. In view of the fact that the leading interest and such independents as are in the market for business are quoting the same prices, the need of double quotations would seem to have passed. Current demands are very light, either because buyers expect to be able later to obtain supplies for even less money or because they do not want to add to their inventories at the present time. Independent mill operations are steadily tapering off, but the American Sheet & Tin Plate Co. is running as full as possible on the supply of steel that is available. Prices are given on page 1583.

Tin Plate.—New demands are negligible but in general the movement against contracts is good, there being little disposition on the part of buyers to hold up their contract shipments. The market is fairly well established at $7 per base box on production orders. Stock items are plenty and are not moving with much freedom, and there is substantiation for reports of sales as low as $6.50. Export demand is at a standstill and with the prices of Welsh makers down considerably from where they were a few weeks ago, sales by American makers at higher than $8.50 per base box Pittsburgh are doubtful.

We now quote tin plate to domestic consumers at $7 per base box; stock items, $6.50 to $7, and for export, $8 to $8.50 per base box, all f.o.b. Pittsburgh.

Iron and Steel Bars.—The drop in independent prices to 2.35c. base for steel bars has brought little business, though one company has taken about 1000 tons, a part of which is said to have come from customers of the Corporation who could not secure as early delivery as desired. The Corporation is shipping much more heavily against old orders than recently, but is not yet promising specified deliveries against new bookings. Reinforcing bars are dull and as those rolled from new steel are available at the mild steel bar base, makers rolling them from old rails are at a disadvantage, despite the drop in old rails. Iron bars are inclined lower, though refined bars have not declined. Common, or scrap iron, bars are being offered at 3.25c. Chicago, or 3.63c. delivered here, while Eastern mills are quoting 4c. Pittsburgh, but this price is thought to refer only to Eastern business.

We quote steel bars rolled from billets at 2.35c.; reinforced bars, rolled from billets, at 2.35c., base; common iron bars, 3.63c. to 4c., delivered Pittsburgh; refined iron bars, 5c. to 5.50c., in carloads, f.o.b. mill, Pittsburgh.

Cold Finished Steel Bars.—Effective Dec. 1, the American Steel & Wire Co. reduced its prices on cold-finished steel bars from 4c. base to 3.60c. base, thus meeting the prices recently named by the independent makers. The report from all makers is that lower prices have not been productive of any increase in demand, but, on the contrary, business the past week has been lighter than it was previously.

Hoops and Bands.—Reduction in the price by some independents to the corporation base of 3.05c. has not been followed by all makers, one company in this district dropping only to 3.50c. base, as compared with the previous price of 5c. Lower prices have not resulted in any increase in business.

Iron and Steel Pipe.—Fears entertained by some of the independent manufacturers of steel pipe that the announcement of lower independent prices on plates, shapes and bars would be followed by a large number of suspensions and cancellations of pipe tonnages thus far have not materialized. On the contrary, specifications are being made freely and no mention of prices is made. New demands in lap-welded pipe, chiefly oil country goods, are really active. We note an inquiry from Mexico for 25 miles of 10-in. line pipe; from California for 35 miles of 6-in. pipe and 10 miles of 12-in. pipe, while inquiries for 5 and 10 miles of the various sizes of line pipe are reported to be numerous. Inquiry for 100 miles of 6-in. pipe, supposed to be for one of the Standard Oil companies, has found no takers. Recent business of the Prairie Pipe Line Co. appears to have been greater than at first reported, amounting to 50,000 tons. This business went entirely to independent companies, two Pittsburgh companies taking between them about 20,000 tons. Deliveries against old contracts continue to increase as the result of the improved car supply. The Youngstown Sheet & Tube Co. is operating all of its pipe-making capacity and Jones & Laughlin Steel Co. also is running full. Operations by other makers are only slightly less. Discounts are given on page 1583.

Nuts, Bolts and Rivets.—Pittsburgh district makers have generally adopted the new schedules recently put out by Cleveland makers. New demands are light and makers here are busy chiefly on old orders. Prices and discounts are given on page 1583.

Chain.—Makers are still holding to the base of $7.25 for 1-in. proof coil and are contemplating no immediate reduction on the ground that present prices are based upon the Industrial Board schedules on bars and rods.

Coke.—Although a large number of ovens have been blown out in the Connellsville region lately, the consequent decrease in production has not been nearly as great as the falling away in consumption. Indeed, some rather big tonnages have been thrown upon the market as a result of the fact that about a dozen furnaces dependent upon bee hive oven coke either have gone out or are about to suspend. While some tonnage is moving to the blast furnaces this week on a basis of $7.50 per net ton oven, sales during the past few days only in a few instances have been at a price higher than $7. To-day $7 is maximum and there were substantial offerings as low as $6.50, while sales of some distress tonnages are noted as low as $5.50. The latter were shipments in transit which had to be reconsigned promptly if demurrage charges were to be avoided. The quotable market on spot furnace coke is $6.50 to $7 per net ton, oven, with the general run of 72-hr. fuel to be had at $7.50 to $8, although some recent business in selected foundry coke was done as high as $10, and some producers were not inclined to

accept less either on spot or contract tonnages. The interest which recently revised first half contracts for foundry grade from $15 to $10 is standing at the latter price, but others are offering to take such business at $8.50 and $9. Fair-sized tonnages of first half of 1921 furnace coke have been negotiated on a basis of five to one on Valley basic pig iron, which, with this grade of iron at $33, would make the price of the coke $6.60.

Old Material.—Prices continue to drop in nearly all grades, not because the offerings are heavy, but because they are very much in excess of the demand. Practically all of the independent steel manufacturers in Pittsburgh and nearby districts have stopped shipments against contracts, and almost the only movement there is at present against expiring contracts or on open orders, and the latter are few. Dealers here lately have been able to pick up tonnages of steel works grades at comparatively low prices. The tonnage of a Pittsburgh district company recently sold at $15.60 for heavy melting steel and $16.65 for compressed sheet steel, and $9 for machine shop turnings, all f.o.b. works, the freight rate into Pittsburgh being $2.10 per ton. None of this material came upon the market at these prices, being applied against contracts carrying much higher figures. Some railroad heavy melting steel has been sold cheaply recently, the price to the dealer being $17.70 delivered. These prices hardly can be considered as market prices, however, for the reason that melters could not buy tonnages at these prices and the purchases in all cases were delivered against contracts carrying much higher figures. Quotations to a large extent merely are approximations and represent about what melters might pay if they were in the market for supplies. The corporation plants seem to be the only ones open for shipments without permits and this interest is getting so much tonnage against old contracts as to be a rather sparing buyer of new tonnages. The Baltimore & Ohio Railroad is offering 23 cars and 15,750 gross tons, bids for which must be in by noon, Dec. 7.

We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$19.00 to $19.50
No. 1 cast, cupola size	28.00 to 29.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	25.00 to 26.00
Compressed sheet steel	17.00 to 18.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	12.50 to 13.00
Railroad knuckles and couplers	20.00 to 20.50
Railroad coil and leaf springs	20.00 to 20.50
Railroad grate bars	20.00 to 21.00
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and heavier	27.00 to 28.00
Railroad malleable	25.00 to 26.00
Iron car axles	40.00 to 41.00
Locomotive axles, steel	35.00 to 36.00
Steel car axles	30.00 to 31.00
Cast iron wheels	31.00 to 32.00
Rolled steel wheels	20.00 to 21.00
Machine shop turnings	10.50 to 11.00
Sheet bar crop ends at origin	20.00 to 21.00
Heavy steel axle turnings	16.00 to 17.00
Short shovel turnings	14.00 to 15.00
Heavy breakable cast	25.00 to 26.00
Stove plate	21.00 to 22.00
Cast iron borings	15.00 to 16.00
No. 1 railroad wrought	23.00 to 24.00

The consolidation of the Semet-Solvay Co. and Solvay Process Co., both of Syracuse, N. Y.; the Barrett Co., Philadelphia; the National Aniline & Chemical Co. and General Chemical Co., both of New York, has been perfected. The different units will continue to operate under their present names, with a consolidating committee in control. The change will become effective Jan. 1.

The American Steel Foundries, 30 Church Street, New York, is operating eight of its nine plants in different parts of the country, a number at full capacity, as well as all nine plants of the Griffin Wheel Co., Chicago, a subsidiary organization. The company is said to have orders on hand to insure present operations for a number of months, with replacement equipment covering the greater part of contracts.

British Prices Tend Lower

Tin Plate Output May Cease—Steel Buying Slackening—Export Business Stagnant

(*By Cable*)

LONDON, ENGLAND, Dec. 6.

The Cleveland pig iron market is inactive and general opinion is to the effect that a reduction in prices is inevitable. Foundry iron for export, however, is now quoted at 247s. 6d. for delivery next year. Hematite pig iron is scarce and makers are well booked, and are not keen for forward orders. Sellers' prices are unchanged.

Foreign ore freights are falling fast and the best Bilbao rubio iron ore is offered at 51s., ex-ship Tees.

Domestic buying of finished iron and steel is slackening and consumers are looking for cheaper prices next year. Export business is stagnant and continental competition is keen. Merchant bars have sold at £13 15s. f.o.b. and beams at £15 15s. f.o.b. German billets, 2 in. to 4 in., have sold at £13, delivered Midlands, and wire rods at £18 f.o.b.

In the tin plate trade most of the plants have posted notices expiring Dec. 31 and it is estimated that the whole output will be stopped within two months. The market is crumbling and merchant business has been done at 37s., basis, f.o.t., for prompt and forward delivery. There is a small inquiry for oil plates and Japan is inquiring for charcoal plates. German tin plate has been sold to Egypt at 35s., basis f.o.b.

The association price for Welsh steel bars is now £17 10s., delivered, but outside sales have been made at £16, delivered. Makers are considering closing down their plants. The galvanized market is weak.

Baldwins, Ltd., is absorbing the British Mannesmann Tube Works.

We quote per gross ton except when otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.46 for £1, as follows:

Ship plates	£26	0	to	£30	0	$89.96	to	$103.80
Boiler plates	30	0	to	35	0	103.80	to	121.10
Tees	25	0	to	27	0	86.50	to	93.42
Channels	24	5	to	26	5	83.90	to	90.82
Beams	24	0	to	26	0	83.04	to	89.96
Round bars, ¾ to 3 in.	26	10	to	29	10	91.69	to	100.87
Rails, 60 lb. and up	25	0	to	27	0	86.50	to	93.42
Billets	15	10	to	16	10	53.63	to	57.09
Sheet and tin plate bars Welsh	16	0	to	17	10	55.36	to	60.55
Galvanized sheets, 24 g.	32	0				110.72		
Black sheets, 24 g.	34	10				119.37		
Tin plate base box	1	18*				6.57		
Steel hoops	34	0				117.64		
Cleveland basic iron	11	15				39.65		
West Coast hematite	15	15				54.49		
Cleveland No. 3 foundry	12	7½				43.80		
Ferromanganese	35	0	to	38	0	121.10	to	131.48
Coke	3	2¾				10.85		

*Prompt delivery; forward, 38s. ($6.57).

May Revise Freight Rates to Pacific Coast

PITTSBURGH, Dec. 7.—A revision downward of railroad freight tariffs on shipments of steel to the Pacific Coast would not be surprising to the trade here in view of the recent action of one coastal steamship company in reducing its rate on shipments from New York, Baltimore and Philadelphia to San Francisco, Los Angeles, and other Pacific ports, via the Panama Canal to 75c. per 100 lb. Adding the rail tariff from Pittsburgh of 33½c. to Baltimore, 35c. to Philadelphia, or even 38c. to New York, the combined rate would be considerably less than the present transcontinental tariff, calling for $1.66½ on all steel products except steel plates. The advantage of the shipments of tin plate via the Canal to Pacific ports would be helpful in meeting foreign competition on Far Eastern export business, it being stated that Welsh tin plate manufacturers to-day can sell delivered in the Far East at a price equivalent to about $8.25 at American Pacific ports.

New York

NEW YORK, Dec. 7.

Pig Iron.—The appearance of a considerable tonnage of iron offered for sale by a new Detroit furnace has caused a stir in the market. One lot of 10,000 tons has been offered at $30, base, but no sales have been reported. Buffalo iron has again receded and $35 to $36, base, is quoted, as compared with $38, base, for the preceding week. Eastern Pennsylvania iron is offered at $39, furnace, base. An inquiry from Calcutta, India, is for 3600 to 4800 tons of iron to be delivered at the rate of 300 to 400 tons each month of 1921. One firm reports inquiries aggregating about 1500 tons for various grades of foundry iron, but the market is almost destitute of new orders.

Ferroalloys.—There is an entire absence of inquiry for either ferromanganese or spiegeleisen. Quotations are nominally unchanged at $150, delivered, for American ferromanganese and $170, seaboard, for the British alloy. There are unconfirmed reports that resale ferromanganese has been sold as low as $130. Imports of the British alloy continue relatively heavy, those for October having been 6700 gross tons, bringing the total of this year to 46,739 tons, or over twice the receipts for the same 10 months in 1919, when they were 22,674 tons. In the absence of business it is difficult to state seller's ideas of spiegeleisen, 19 to 21 per cent, reports being in circulation that this has sold as low as $60 to $63, furnace. The last quotation available was $72.50, furnace. There is no demand for manganese ore, the quotation for which is nominal at 45c. to 50c. per unit, seaboard. Importations continue heavy, having been 44,700 tons in October, bringing the total for the 10 months of this year to 467,712 tons. Ferrosilicon, 50 per cent, is inactive at $80 to $85 per ton, delivered.

High Speed Steel.—A slightly better tone is noted, consumers evidently having exhausted stocks and buying small quantities for immediate needs. Domestic producers quote $1.25 per lb. for 18 per cent tungsten high speed steel, although fair sized orders bring a lower price.

Warehouse Business.—The downward revision of prices continues this week, although business shows no increase despite recent reductions. Quotations on sheets by most warehouses, including the foremost independent, are now at 5.50c. per lb. for No. 10 blue annealed, 6.50c. per lb. for No. 28 black sheets and 8c. per lb. for No. 28 galvanized sheets. Soft steel bars have been dropped from 4.15c. per lb. base to 3.70 per lb., and cold-rolled steel bars are 5.50c. per lb. One independent warehouse is quoting steel bars at 3.58c. per lb., beams, channels and angles at 3.68c. per lb. and steel plates at 3.88c. per lb. These prices include delivery in the Metropolitan district and the Carnegie Steel Co. has a trucking charge of 15c. per 100 lb. Brass sheet, rod, tube and wire is off about 2c. per lb. from prices of last week. While welded pipe, standard steel and wrought iron shows no change in price, better deliveries from mills are noted. The slight decrease in new business, usual at this season, is noted. Further slight reductions in other materials are expected. We quote prices on page 1596.

We quote for delivery in the New York district as follows, adding to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa., No. 1 fdy., sil. 2.75 to 3.25	$43.52 to $46.52
East. Pa., No. 2X fdy., sil. 2.25 to 2.75	42.77 to 44.77
East. Pa., No. 2 fdy., sil. 1.75 to 2.25	41.52 to 43.52
Buffalo, sil. 1.75 to 2.25	40.46 to 41.46
No. 2 Virginia, sil. 1.75 to 2.25	46.16 to 47.16

Finished Iron and Steel.—Following the announcement of reductions in steel prices to the level quoted by the Steel Corporation since March 21, 1919, have come requests for cancellations or revision of prices to that basis. Both domestic and export buyers have asked for such concessions, amounting virtually to a demand in many instances. Even on small lots, carloads or less, for which specific orders had been entered, revision appears to be expected here and there. Railroads have been prominent in this matter. No promising improvement in business has resulted in this locality from the now uniform low price levels. A few small orders have been entered for prompt shipment, but in the main buyers are not interested either in prompt or future commitments. A leading independent is now quoting plates, shapes, bars, tinplate, black plate, light rails, cold drawn bars and shafting and spikes at the same prices as named by the Steel Corporation, with the exception that small shapes, under 3 in., and plates 3/16 in. and under take a base price of 3c., Pittsburgh, though 2.45c. and 2.65c., respectively, might be quoted on large tonnages. A leading Eastern independent has decided to make no immediate change in its quotations, which remain at 3c. for plates, shapes and bars. Perhaps nothing but less than carload lots for prompt shipment is expected to go at this price. The rail situation is becoming clarified by the decision of leading independents to quote $57, mill, on heavy rails, $10 above the Steel Corporation price. The Florida East Coast Railroad is in the market for 15,000 tons of rails, which it could not place with the Steel Corporation. Buying of cars has suffered a set-back with the announcement of lower prices on finished steel by independents, despite the fact that quotations of car builders have been predicated on Steel Corporation prices for some time. The Norfolk & Western, Western Maryland and Minneapolis & St. Louis railroads have withdrawn their inquiries for cars, aggregating a few thousand. Approximately 70,000 cars have been bought this year by the railroads and private companies and the car building plants are working at nearer full capacity than at any time in more than a year. According to the Association of Railway Executives the extent of railroad buying in 1921 is largely dependent on the earnings of the roads under the new rates and their ability to borrow money at lower rates of interest. It is intimated that the withdrawal of inquiries for cars, noted above, is due to an expectation that money rates will be more reasonable within a few months. A slight improvement in lettings of structural steel fabrication is noted. The Hedden Iron Construction Co. has received contracts for the Providence-Biltmore Hotel, Providence, R. I., 2500 tons, and the Curb Exchange Building, New York, 750 tons. The Levering & Garrigues Co. will fabricate 1900 tons for the Hartford Trust Co., Hartford, Conn.; the McClintic-Marshall Co. has received the contract for a power house and crane runways for the Standard Oil Co. of New Jersey, 1700 tons; the Belmont Iron Works will fabricate 250 tons for the American Cellulose Co. addition, Amcelle, Md., and the McLean Construction Co. has the contract for fabricating 550 tons for a highway bridge in Nassau County, Long Island. The Merchants & Manufacturers Bank Building, Newark, 1600 tons, has been withdrawn from the market.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.73c.; plates, 3.03c.; shapes, 2.83c.; bar iron, flats, wider than 6 in., 4.88c., with half extras; light rounds, squares and flats, 5.38c., with full extras, and other sizes, 4.38c., with half extras.

Cast-Iron Pipe.—In the absence of real new business, the quotations below are nominal. If the market received a fair test, these prices might be lower. A little pipe is being shipped to South America and Cuba. The labor scarcity, which was acute a few weeks ago, is now relieved because of heavy immigration and absence of much new business. One maker will close his plant for the full month of January, taking advantage of the lull to make repairs and improvements. Others will probably do the same. We quote f.o.b. New York, 6-in. and larger, $77.22; 4-in., $87.22; 3-in., $97.22, with $2 additional for Class A and gas pipe.

Old Material.—The market is still receding, with here and there a sale to establish a new low price. Most sales are by those dealers who need the cash and are not willing to hold for a turn in the market. The chief decrease in price is in cast scrap. A few purchases of No. 1 machinery cast have been made, one of which was of 150 tons of No. 1 machinery cast at $25,

New York. Recent purchases of car wheels were made at $3 lower than the previous market price.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$11.50 to $12.50
Rerolling rails	20.50 to 21.50
Relaying rails, nominal	50.00 to 53.00
Steel car axles	21.00 to 22.00
Iron car axles	34.00 to 35.00
No. 1 railroad wrought	19.00 to 20.00
Wrought iron track	16.00 to 17.00
Forge fire	9.00 to 10.00
No. 1 yard wrought long	17.00 to 18.00
Light iron	5.00 to 6.00
Cast borings (clean)	13.50 to 14.50
Machine-shop turnings	10.00 to 11.00
Mixed borings and turnings	9.00 to 10.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	10.00 to 11.00
Stove plate	18.00 to 19.00
Locomotive grate bars	17.00 to 18.00
Malleable cast (railroad)	16.50 to 17.50
Old car wheels	24.00 to 25.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$28.00 to $29.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	28.00 to 29.00
No. 1 heavy cast, not cupola size	18.00 to 19.00
No. 2 cast (radiators, cast boilers, etc.)	22.00 to 23.00

Cleveland

CLEVELAND, DEC. 7.

Iron Ore.—The iron ore shipping season has closed with a total movement by water of 58,527,226 gross tons. November shipments were 5,305,738 tons and about ten cargoes were brought down during the first week in December, amounting to 99,146 tons. Early in the season, estimates were made that water shipments would reach as high as 61,000,000 tons, but later as conditions changed these estimates were cut down. Although transportation conditions interfered with the ore movement during the earlier part of the season, most of the ore firms caught up on their shipping schedules before the close of the shipping season. With all-rail shipments estimated at 1,500,000 tons, the total movement for the season will be approximately 60,000,000 tons. A tabulation of the shipments by port will be found elsewhere in this issue.

The amount of ore on Lake Erie docks Dec. 1 was over 500,000 tons greater than on that date in any previous year. The amount this year was 10,955,868 gross tons as compared with 10,454,843 tons on Dec. 1 last year. The dock balance Dec. 1 a year ago exceeded that of any previous year.

We quote delivered lower lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—There have been additional suspensions of shipments, particularly on foundry iron, and consequently furnaces are piling more iron than they were in November. There is very little buying and this mostly in car lots. With prices declining, consumers needing iron are buying a car lot at a time, believing that when this is used up they will be able to purchase another small lot at a lower price. One lake furnace has reduced its price $2 a ton to $37 for No. 2 foundry iron on a few carlot sales, but others are adhering to the $39 price and not attempting to compete with resale iron. Considerable resale iron is still being offered, but a very limited market is being found for it in this territory. Sellers are asking for offers rather than naming prices. A Mansfield, Ohio, consumer who recently inquired for 250 tons of 2.75 to 3.25 per cent silicon iron purchased resale iron in Cleveland at $36 base, paying the usual $3 differential for the high silicon. An Indianapolis consumer has purchased 500 tons of resale malleable iron for December shipment at a price that would have compelled Cleveland producers to shade $35 to meet the low quotation. Resale silvery iron is being offered at $50 for 8 per cent, but some has been sold at a lower price. Some consumers are asking that contracts for foundry iron taken at $40 and higher be revised to meet present market conditions. Pickands, Mather & Co. plan to blow out one of their Toledo furnaces this month.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$34.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$35.56 to 39.56
Southern fdy., 2.25 to 2.75	44.67 to 46.67
Ohio silvery, sil. 8 per cent	53.36 to 58.36
Standard low phos., Valley furnace	52.00 to 55.00

Coke.—One consumer is inquiring for 1800 tons of foundry coke for the first half, but with this exception consumers are showing no interest in the market. Standard Connellsville foundry coke for prompt shipment is quoted at $8.50 to $10 at oven.

Semi-finished Steel.—Independent mills are rapidly getting down to the Steel Corporation's price on semi-finished steel. One Valley mill is quoting 4-in. billets at $45, forging billets at $50 to $55 and sheet bars and slabs at $47.

Finished Iron and Steel.—With buying stimulated only slightly by the price reductions, mill operations are being further curtailed. The Bourne-Fuller Co. has shut down its Upson Steel Co. plant, including both open-hearth furnaces and mills. The United Alloy Steel Corporation, Canton, has shut down its plant, having recently been operating only five open-hearth furnaces, and the McKinney Steel Co. is considering the entire suspension to-day of its steel plant operations. For some time it has been operating 7 out of 14 open-hearth furnaces. Producers, with the exception of Eastern mills, are meeting the Steel Corporation's price on steel bars, plates and structural material. The reduction in prices has resulted in the release of some suspended tonnage, particularly of steel bars by bolt and nut manufacturers. Few consumers are inclined to place first quarter contracts, and mills are not seeking orders for that delivery. However, the leading interest is converting into first quarter contracts some suspended tonnage in order to assure the buyers deliveries over an extended period. There seems to be no disposition among independent mills to shade Steel Corporation prices. On an inquiry for 800 tons of plates for the Pacific Coast, a local mill declined to shade 2.65c. It would have had to go slightly under 2.60c. to meet Eastern mills for shipment to Baltimore. Lower cost of building work has resulted in an improvement in the building outlook. Mill orders have been released for 18,000 tons of structural steel for the Citizens-Union Bank building, Cleveland, that was held up early in the year. Hard steel reinforcing bars have declined to the soft steel bar price, although mills are still able to make sales at 2.50c. for prompt shipment.

Cleveland warehouses quote steel bars at 3.30c. to 3.34c.; plates, 3.60c. to 3.64c. and structural material, 3.40c. to 3.44c.; No. 9 galvanized wire, 4.70c.; No. 9 annealed wire, 4c.; No. 28 black sheets, 5.75c. to 5.90c.; No. 28 galvanized, 7.25c.; No. 10 blue annealed, 5c. to 5.75c.

Sheets.—Practically all of the independent mills are now meeting the American Sheet & Tin Plate Co.'s prices on sheets without formally naming those as their regular prices. The situation in respect to automobile body sheets has not yet been cleared up, but the indications are that the leading independent mills will meet the Steel Corporation prices.

Warehouse Business.—One local warehouse has reduced prices on steel bars, plates and structural material to 4c. per 100 lb. below the Carnegie Steel Co.'s warehouse price and has reduced cold-rolled steel bars to 5c. Mill price reductions on sheets have been followed by sharp cuts in warehouse prices. Owing to the improved mill deliveries, warehouse business is unusually light.

Bolts, Nuts and Rivets.—Most of the bolt and nut manufacturers in this district have met the reduction in bolt and nut prices announced last week. The reduced prices have not stimulated business, but seem to have had the effect of shutting off further cancellations. The price of blank cold pressed nuts has been reduced, but no price change has been made on the same nuts tapped. For some time there had been a differential in quotations on these nuts, both having list plus $1. Some of the manufacturers of semi-finished nuts have made sharp cuts in prices, the reductions ranging from 17½ to 35 per cent from the prices that have been prevailing for some time and which have been very irregular. There has been little activity in rivets since the $5 a ton price reduction reported last week. Some first quarter inquiries have come out but have not yet resulted in orders. Manufacturers will take first quarter contracts at present prices with a guarantee against a further decline.

Old Material.—The market continues almost lifeless with prices still showing a downward tendency. The Bourne-Fuller Co. has suspended shipments of scrap to the open hearth furnaces of the Upson steel plant, with the exception of heavy melting steel for its stock yard. The McKinney Steel Co. is taking scrap only for its blast furnaces, and other consumers are still holding up shipments. Dealers are freely offering heavy melting steel at $17, and one local mill is offering that price for selected heavy melting steel scrap to lay down in its yard. Dealers are not buying for yard stocks, and there is so little activity in the market that most quotations are nominal. Railroad malleable is hard to move and has declined sharply. After purchasing small lots of this grade at $22 and $24, a Cleveland dealer during the week purchased several carloads at $18 50 delivered Cleveland.

Dealers quote delivered to consumers' yards in Cleveland and vicinity, as follows:

Per Gross Ton	
Heavy melting steel	$18.00 to $18.50
Steel rails, under 3 ft	22.00 to 23.00
Steel rails, rerolling	22.00 to 23.00
Iron rails	22.00 to 23.00
Iron car axles	38.00 to 39.00
Low phos. melting scrap	23.00 to 24.00
Cast borings	14.50 to 15.00
Machine shop turnings	9.50 to 10.00
Mixed borings and short turnings	14.50 to 15.00
Short turnings for blast furnaces	14.50 to 15.00
Compressed steel	15.50 to 16.50
Railroad wrought	22.00 to 23 00
Railroad malleable	26 00 to 27.00
Steel axle turnings	15.00 t o 15.50
Light bundled sheet stampings	10.00 to 11.00
Drop forge flashings over 10 in	10.00 to 11.00
Drop forge flashings under 10 in	10.00 to 11.00
No. 1 bushelings	13.00 to 14.00
Railroad grate bars	23.00 to 23.50
Stove plate	23.00 to 23.50
Cast iron car wheels	27.00 to 27.50
Pipes and flues	15.00 to 15.50

Iron Ore Movement by Water for the Season

The iron ore movement by water from the Lake Superior district during the season just closed was 58,527,226 gross tons, a gain of 11,349,831 tons over 1919. Shipments by water during the past four years were as follows: 1919, 47,177,395 tons; 1918, 61,156,732 tons; 1917, 62,498,901 tons; 1916, 64,734,198 tons. Ore shipments during November were 5,305,738 tons, an increase of 2,153,419 tons over the same month last year. The December shipments were 99,146 tons. The following table gives the season's shipments by ports and the corresponding figures for 1919 in gross tons:

	Season 1919	Season 1920
Escanaba	4,963.358	7,361,070
Marquette	2,132,935	3,415,108
Ashland	5,915,383	8,180 852
Superior	10,919,965	14,812,398
Duluth	16,821.209	15,479,334
Two Harbors	6,424,545	9,278,464
Total	47,177,395	58,527.226
1920 gain		11,349,831

Buffalo

BUFFALO, Dec. 6.

Pig Iron.—Demand shows no improvement and the few sales reported are practically all for resale iron. Orders for furnace iron are rare and for small tonnages. One sale of resale reported was for 70 tons of No. 2 at $36. The same agency said they had other tonnages at the same price. A sale of furnace iron, No. 2 X, amounting to 100 tons, went at $43.25. About 500 tons of all grades of foundry resale was sold at a base price of $37. One furnace reported it made a quotation of $42.25, but was informed it was $10 higher than other offers received. Another interest is said to have practically adopted an official schedule with $40, base.

We quote f.o.b. Buffalo, as follows:

No. 1 foundry, 2.75 to 3.25 sil	$40.00 to $41.00
No. 2 X foundry, 2.25 to 2.75 sil	37.25 to 39.25
No. 2 plain, 1.75 to 2.25 sil	36.00 to 38.00
Basic	36.00
Malleable	35.00 to 36.00
Lake Superior charcoal	55.00

Finished Iron and Steel.—Sales continue quiet and local interests say little improvement can be expected before the first of the year. One mill reported slightly heavier inquiry, although it is not felt that conditions generally are improving. One interest has taken a few contracts ranging from 100 to 200 tons on bars, shapes and plates at 2.35c., 2.45c. and 2.65c., respectively. This same producer earlier in the week said no announcement of price reduction would be made but each order would be considered separately. Prices on castings have been reduced and are now quoted at 6c. per lb. and up. Price reduction has not had the effect of stimulating business. Several New York State foundries have cut labor prices 15 per cent. Plans for 13 of the new public schools in Buffalo will be ready by Jan. 1, when approximately 2000 tons of reinforcing bars will be required. Mill operation during the week is estimated at 50 to 60 per cent. About 100 tons of structural steel for use in the new Stanley Steel Welded Wheel Corporation plant will be fabricated by the Kellogg Structural Steel Co.

We quote prices f.o.b. Buffalo as follows: Structural shapes, $3.60; plates, $3.80; plates, No. 8 gage, $4.90; soft steel bars and shapes, $3.50; hoops, $4.70; blue annealed sheets, No. 10 gage, $5.40; galvanized steel sheets, No. 28 gage, $8.50; black sheets, No. 28 gage, $7.

Warehouse Business.—The market is quiet with little buying or selling. A local warehouse has made a further decrease in its schedule since the last reduction of Nov. 15.

Old Material.—Further reduction in prices is noted but demand is poor and sales of little consequence. The few sales noted are on old contracts. Most of the local mills have greatly reduced their scrap piles. None of the Buffalo dealers are hopeful of a resumption of activity very soon.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo as follows:

Heavy melting steel, regular grades	$18.00 to $19 00
Hydraulic compressed	16.00 to 17.00
Low phos., 0.04 and under	29.00 to 30.00
No. 1 railroad wrought	24.00 to 25.00
No. 1 machinery cast	30.00 to 31.00
Iron and steel axles	35.00
Car wheels	30.00 to 31.00
Railroad malleable	21.00 to 22.00
Machine-shop turnings	12.00 to 13.00
Heavy axle turnings	17.00 to 18.00
Clean cast borings	15.00 to 16.00
Iron rails	27.00 to 28.00
Locomotive grate bars	17 00 to 18.00
Stove plate	20.00 to 21.00
Wrought pipe	14.00 to 15.00
No. 1 busheling	15.00 to 16.00
Bundled sheet stampings	11.00 to 12.00

Birmingham

BIRMINGHAM, ALA., Dec. 7.

Pig Iron.—Even at the new level of $38 no real business was done in the Birmingham iron market during the week ending last Saturday. The only two sales recorded were a car lot and one of 50 tons by the two larger foundry interests, one each, on the $42 base. These sales indicate nothing beyond the need of a small amount of iron for rush shipment by consumers preferring a certain grade to which accustomed. There is no contention that the market is above $38 if a market it can be called. The lull has been lately the most pronounced of which makers have memory. Neither do they expect any recovery before the year has well turned. Shipments have been better than might have been expected. One concern piled a lot of iron, but at least three others declare that they did not do so during November. Production has been recently decreased by a total of five stacks, three of the Woodward Iron Co., the Jenifer and one of the Republic Iron & Steel Co., which was blown out on Dec. 1, leaving it but one active stack. It has been, of course, refreshing to the Birmingham district to have the Tennessee company operating one more stack than the years average and it was especially of interest when the company, for the first time in many months, added a second stack to its foundry production. This is taken to mean that the Tennessee company intends to furnish the $38

iron that has been ordered on time and as ordered. The six stacks on basic are for company use as is also the stack on ferro-manganese. Five thousand tons of Brazilian ore is now at Mobile waiting movement up the river in barges for the Tennessee company. All the Tennessee company steel operations are averaging normal, in fact, some increases were made over September and October in November. The order books of the American Steel & Wire Co. mills at Fairfield are in good form and the plant is behind in deliveries. Its momentum based on orders in hand will carry it well into the first quarter. News from the independent steel makers is not so good, especially with regard to those mill products that go for agricultural purposes. Nails are in strong demand and new orders are being booked in respectable quantities. The activity of charcoal iron has proven continuous over at least two weeks. Orders have come from Pennsylvania, Delaware, Illinois and Southern points. The takers are car wheel makers and the demand indicates a continuing policy of car building. The car service is all that could be asked and, where anything accumulates now, it is due to hold up orders.

We quote per gross ton f.o.b. Birmingham district furnaces, the Tennessee company included, as follows:

Foundry, sil. 1.75 to 2.25	$38.00
Basic	$37.00 to 38.00
Charcoal	54.00 to 55.00

Cast Iron Pipe.—Pipe is very dull. Three-fourths of the sanitary pipe foundry floors are down and out. Sales are confined to scattering lots on a general base of $90. The gas and water pipe market is not above $70 for 6 in. and upwards and $74 for 4 in.

Coal and Coke.—Standard foundry coke can be secured at $10 and furnace coke at $9. Chattanooga is offering $7 coke base with $2 freight to Birmingham. That means price shading when necessary. Coke levels are altogether $4 to $5 per ton under the recent high prices. The supply is ample. Steam coal production is about normal with some low grades dull. The mine strike drags on with the strikers well fed by the union and the State militia on guard.

Old Material.—The yards are doing practically no business beyond delivery on old contracts and not a great deal of that. Prices are nominal.

We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Old steel rails	$17.00 to $18.00
No. 1 heavy steel	16.00 to 17.00
No. 1 cast	27.00 to 28.00
Car wheels	27.00 to 28.00
Tramcar wheels	25.00 to 26.00
No. 1 wrought	21.00 to 22.00
Stove plate	14.00 to 15.00
Cast iron borings	7.00 to 8.00
Machine shop turnings	7.00 to 8.00

Cincinnati

CINCINNATI, Dec. 7.

Pig Iron.—Buying is virtually at a standstill. Inquiries received are mostly for carload lots and are being filled with resale iron. The largest sale reported was for 200 tons of Southern high silicon foundry iron, taken by a melter in this territory, at $38, Birmingham, base. This was a direct furnace sale. One southern Ohio furnace has reduced its price to $38, Ironton, for No. 2 foundry, and several others have quoted $40, on carload lots. Resale prices on Northern foundry iron range from $33 to $42. The disposition on the part of many melters offering this iron is to accept what they can get for it for quick sale and charge the losses on this year's operations. Several instances of iron bought at $43 being offered at $35 are reported. Very little malleable iron is being offered for resale, as most of the malleable shops are running about 75 per cent of capacity, compared with 35 to 50 per cent by grey iron foundries. Southern iron is offered for resale at $36 to $38, furnace base. No transactions are reported in silveries or basic. Milton furnace in southern Ohio has been blown out, and it is probable that Ironton stack at Ironton will go out this week. The lower figures in the quotations below represent resale prices, and the higher figures furnace prices.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$40.50 to $42.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	41.75 to 43.75
Ohio silvery, 8 per cent sil	55.52 to 57.52
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	35.52 to 40.52
Basic northern	35.52 to 37.52
Malleable (nominal)	40.52 to 42.52

Finished Material.—Reduction by independent mills of their prices to conform to the Steel Corporation's schedule has had the effect of bringing out some inquiries for bars, shapes and plates. While the inquiries are not for very big tonnages, the aggregate amounts to a very fair total. Much of this business calls for early delivery, and to date very little inclination is being shown by consumers to cover for their first quarter needs. The sheet market is quiet, and while the American Sheet & Tin Plate Co. has opened its books for first half, its action has not been followed by any of the mills operating in this part of the State. No announcements have as yet been made as to the probable course the independents will pursue in their sheet prices. One company in the Youngstown district has reduced its quotations to the Steel Corporation base and another to 4.05c. base for blue annealed, 4.85c. for black, and 6.20c. for galvanized. An independent company has also announced that hereafter its prices on cold-rolled will be 3.60c. base, on carload lots, and 3.85c. on less than carload lots, f.o.b. Pittsburgh. The structural market is very quiet, but it is said that a number of projects involving considerable tonnages of steel will be announced shortly. Local warehouses report business as fair. Following the announcement that cold-rolled products had been reduced, several local warehouses announced that a lower price would go into effect immediately, and cold-rolled rounds, 1½ in. and over, are now quoted at 5.20c., under 1½ in., and flats, squares and hexagons, at 5.70c.

Iron and steel bars, 3.75c. base; small angles, 4.15c.; hoops and bands, 13 gage and lighter, 5.50c. base; structural shapes, ¼-in. and heavier, 3.85c. base; reinforcing bars, 3.82½c. base; cold rolled rounds, 1½-in. and over, 5.20c.; under 1½-in. and flats, squares and hexagons, 5.70c.; No. 10 blue annealed sheets, 6.35c. base; black sheets, 28-gage, 8c.; galvanized sheets, 28-gage, 9c.; wire nails, $4.50 per keg, base.

Tool Steel.—Very few sales are being made, and these only for small amounts for immediate delivery. It is reported that some makers are offering 18 per cent tungsten high speed steel at $1.05 per lb., and that English high speed steel is being offered at 90c. The usual quotation, however, for 18 per cent tungsten, is $1.20 per lb., with a 10 per cent discount for orders totaling 5000 lb.

Coke.—The coke market is extremely dull. Connellsville furnace coke was offered to-day at $7.50 to $8, and foundry at $9. Wise County and New River foundry coke are unchanged at $11 and $11.50 respectively.

Old Material.—Trading in the scrap market is confined almost entirely to dealers. Offerings are small and it is said that some of the railroads are holding back materials until conditions become more normal. Prices, which are largely nominal, are unchanged.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$9.50 to $10.50
Old iron rails	22.50 to 23.50
Relaying rails, 50 lb. and up	46.50 to 47.50
Rerolling steel rails	25.50 to 26.50
Heavy melting steel	15.50 to 16.50
Steel rails for melting	18.50 to 19.50
Car wheels	30.50 to 31.50
Per Net Ton	
No. 1 railroad wrought	17.50 to 18.50
Cast borings	8.50 to 9.00
Steel turnings	6.00 to 6.50
Railroad cast	22.50 to 23.50
No. 1 machinery	25.50 to 26.50
Burnt scrap	18.50 to 19.50
Iron axles	31.00 to 31.50
Locomotive tires (smooth inside)	17.00 to 18.00
Pipes and flues	10.50 to 11.00
Malleable cast	18.50 to 19.00
Railroad tank and sheet	10.50 to 11.00

Boston

BOSTON, Dec. 7.

Pig Iron.—Almost no business in resale iron is reported this week. Prices at which such iron is offered take a wide range, approximately $30 to $45 furnace base, but they really mean very little because there is almost no opportunity to sell. If a real market for iron existed, it is practically certain $30 iron would not be available. As to $30 iron, a limited tonnage of eastern Pennsylvania silicon 2.25 to 2.75 has been offered at $36 delivered common New England points. Allowing for the differential and a $4.06 freight, brings the furnace price down to $30.69 base. Less activity is noted in the foundry industry, and reductions in casting quotations and in wages are beginning to be noted. Furnace shipments have slowed up somewhat because most of the important foundries have enough stock piled to last 90 days or longer. They might, however, need an odd car for certain mixtures. With such stocks on hand and with iron still due, at the present rate of operation, the average New England foundry is covered well into or through the first quarter, next year. Alabama, Virginia and eastern Pennsylvania furnaces apparently are nearer caught up with New England orders on their books than are northern. Delivered resale iron prices, which are purely nominal, follow:

East. Penn., sil. 2.25 to 2.75	$45.31 to $48.31
East. Penn., sil. 1.75 to 2.25	44.06 to 47.06
Buffalo, sil. 2.25 to 2.75	45.21 to 48.71
Buffalo, sil. 1.75 to 2.25	43.96 to 47.46
Virginia, sil. 2.25 to 2.75	47.83 to 49.83
Virginia, sil. 1.75 to 2.25	46.58 to 48.58
Alabama, sil. 2.25 to 2.75	49.91 to 53.91
Alabama, sil. 1.75 to 2.25	48.66 to 52.66

Finished Iron and Steel.—Although fabricators' yards are well supplied with material, the structural market shows signs of life. The Hedden Iron Construction Co., New York, is awarded 2560 tons for a Providence, R. I., hotel; the Lehigh Structural Steel Co., 230 tons for the Connecticut Adamant Plaster Co., New Haven, Conn. plant; the Eastern Bridge & Structural Co. the structural for a New Britain, Conn., school; while bids will be opened Dec. 20 on 1000 tons for the Kittery, Me., bridge, and an inquiry for about 1000 tons for the Edison company's South Boston plant addition is in the making. All companies are either quoting the Steel Corporation price on shapes or 10c. higher, and the same is true, with the exception of one mill which continues to quote 3c., on bars. Bookings for 1921 bar business are limited. A contractor is booked for 450 tons concrete bars, first quarter delivery, at the Steel Corporation price. The Boston Elevated Railway has purchased 1100 tons T rails from the Bethlehem Steel Corporation, at $57 f.o.b. Pittsburgh. The Massachusetts Northern Railway is inquiring on 1000 tons T rails.

Coke.—The demand for spot foundry coke practically has disappeared, and all but one New England Coal & Coke Co. oven battery has been turned over to the production of domestic sizes for which there is a growing demand at $14 f.o.b. Everett. Connellsville foundry coke is offered here at $8.50 to $10.50 f.o.b. ovens, or about $14.70 to $16.70 delivered. The quality of $8.50 coke offered is questionable inasmuch as the brand and the tonnage available is not well known here. The Providence Gas Co. is reported as making further offerings of spot coke on a $11 Connellsville base or slightly better than $17 delivered, while the New England Coal & Coke Co. continues to quote $19.20 delivered where the freight does not exceed $3.40, or $13 Connellsville base. Additional 1921 coke contracts have been signed up since last reports, but foundries still fail to show much enthusiasm regarding them.

Warehouse Business.—Prices on iron and steel have been revised twice during the past week. As compared with a week ago, steel and iron hoops are $2 per 100 lb. lower; cold rolled rounds, squares and hexagons and best refined iron, $1.50; small steel bands, 95c.; iron bands, 85c.; tire steel and Wayne iron, 50c.; soft steel bars and angles, 45c.; blue annealed sheets, 25c.; plates, 15c. to 20c.; and steel flats, 15c. Prices on cold rolled flats take a wide range, $7.50 to $9.50 per cwt. Prices otherwise show little change. The lower prices appear to have discouraged rather than encouraged buying. Local warehouse stocks are larger than they have been before this year, and mills are agreeing to hold back shipments until after Jan. 1. Few 1920 mill contracts have been repriced lower than 3.25c. f.o.b. Pittsburgh. Galvanized bar prices are unchanged, they being about $2 per 100 lb. higher than they were a year ago. Sheet lead has been dropped from 14½c. to 13c. per lb. base. Cut nails are more plentiful, but wire are still scarce. Lead pipe has been marked down to 12c. per lb. base, tin lined lead pipe to 25c. and block tin pipe to 85c. Structural rivets are quoted at $7.15 to $8.15 per 100 lb. keg base, as against $8.15 a week ago.

Jobbers now quote: Soft steel bars, $3.70 per 100 lb. base; flats, $4.50 to $4.85; concrete bars, $4 to $4.25; tire steel, $5 to $5.50; spring steel, open hearth, $8.50; crucible, $14; steel bands, $4.65 to $6.25; steel hoops, $6; toe calk steel, $7; cold rolled steel, $5.50 to $9.50; structural, $3.70 to $5.50; plates, $4 to $4.40; No. 10 blue annealed sheets, $5.90; No. 28 black sheets, $8.15; No. 28 galvanized sheets, $9.50; refined iron, $4.65 to $5.65; best refined, $5.50; Wayne, $8.50; band iron, $4.65; hoop iron, $6; Norway, $15.

Old Material.—The offering of a fairly large tonnage of strictly No. 1 machinery cast at $30 delivered by one of the largest dealers, which represents a drop of about $2 in local yard prices during the past week, has been met by the trade in general, but actual sales have been few. At $30 delivered, this material is approximately $20 a ton below the top price of the 1920 market. Sales of stove plate also have been limited. Foundries, however, have, within the past day or so, evinced some interest in early January deliveries, and created an impression locally that the bottom in machinery cast and stove plate, at least, have been reached. Dealers are buying limited tonnages of heavy melting steel against old Pennsylvania mill contracts, but such melters are not particularly anxious for material and are inclined toward rejections. The market on No. 1 stock is a shade softer and the same is true as regards wrought pipe. Increased offerings and smaller demands for machine shop turnings and forged scrap have sent the market off about 50c. Local yard prices on old material follow:

No. 1 heavy melting steel	$11.00 to $12.00
No. 1 railroad wrought	19.00 to 20.00
No. 1 yard wrought	16.00 to 17.00
Wrought pipe (1-in. in length, over 2 ft. long)	11.50 to 12.50
Machine shop turnings	9.50 to 10.00
Cast iron borings, rolling mill	14.00 to 15.00
Cast iron borings, chemical	16.00 to 17.00
Heavy axle turnings	9.50 to 10.00
Blast furnace borings and turnings	8.00 to 9.00
Forged scrap	9.50 to 10.00
Bundled skeleton	9.50 to 10.00
Street car axles, steel	20.00 to 21.00
Car wheels	29.00 to 30.00
Machinery cast	27.00 to 28.00
No. 2 cast	24.00 to 26.00
Stove plate	19.00 to 20.00
Railroad malleable	23.00 to 24.00
Rerolling rails	21.00 to 22.00

St. Louis

ST. LOUIS, Dec. 6.

Pig Iron.—So little business is appearing in the pig iron market that such as does come to actual transaction is almost negligible. There is little or no disposition on the part of melters to enter into commitments and furnace representatives are of the opinion that nothing in the way of price will move a buyer. One sale of 200 tons was reported the past week, but this was at a sacrifice price and there is no certainty as to whether it was by a furnace direct or was a resale unloading of a troublesome lot to get the cash. There have been some reports of offers of resale iron in this market, but no transactions.

Finished Iron and Steel.—No new developments are reported in the finished product situation by the mill representatives and no contracts ahead are being sought or made. There is some disposition on the part of consumers to hold up deliveries and the mills are acceding to this until the consumers can readjust themselves, take inventories and determine the shapes and sizes needed in order to revise their orders now on the books in

accordance with the use they have for their contracted material. Prices have been readjusted and for stock out of warehouse we quote as follows:

Soft steel bars, 3.57½c.; iron bars, 3.57½c.; structural material, 3.67½c.; tank plates, 3.87½c.; No. 10 blue annealed sheets, 4.77½c.; No. 28 black sheets, cold-rolled, one pass, 6.10c.; No. 28 galvanized sheets, black sheet gage, 7.45c.

Old Material.—The scrap market has been unutterably dull during the past week, with not enough business to establish any changes in quotations. The figures given, therefore, are estimates of value rather than evidences of transactions. The lists out closing this week included the Pennsylvania, 3000 tons; Missouri, Kansas & Texas, 1400 tons; Mobile & Ohio, 1200 tons; St. Louis & San Francisco, 2300 tons, and the Wabash, 1500 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	$24.00 to $24.50
Old steel rails, rerolling	18.50 to 19.00
Old steel rails, less than 3 ft.	17.00 to 17.50
Relaying rails, standard section, subject to inspection	40.00 to 45.00
Old car wheels	32.00 to 32.50
No. 1 railroad heavy melting steel scrap	16.00 to 16.50
Heavy shoveling steel	15.00 to 15.50
Ordinary shoveling steel	14.00 to 14.50
Frogs, switches and guards cut apart	16.00 to 16.50
Ordinary bundled sheet	9.50 to 10.00
Per Net Ton	
Heavy axle and tire turnings	9.50 to 10.00
Iron angle bars	24.00 to 24.50
Steel angle bars	15.00 to 15.50
Iron car axles	34.00 to 34.50
Steel car axles	23.00 to 23.50
Wrought arch bars and transoms	25.00 to 25.50
No. 1 railroad wrought	17.00 to 17.50
No. 2 railroad wrought	16.00 to 16.50
Railroad springs	15.00 to 15.50
Steel couplers and knuckles	16.00 to 16.50
Locomotive tires, 42 inches and over, smooth inside	14.00 to 14.50
No. 1 dealers' forge	13.00 to 13.50
Cast iron borings	8.00 to 8.50
No. 1 busheling	16.00 to 16.50
No. 1 boilers, cut to sheets and rings	11.00 to 11.50
No. 1 railroad cast scrap	22.00 to 22.50
Stove plate and light cast scrap	18.50 to 19.00
Railroad malleable	17.00 to 17.50
Agricultural malleable	16.00 to 16.50
Pipes and flues	11.50 to 12.00
Railroad sheet and tank scrap	10.50 to 11.00
Railroad grate bars	15.00 to 15.50
Machine shop turnings	6.00 to 6.50
Country mixed scrap	9.50 to 10.00
Uncut railroad mixed scrap	10.00 to 10.50
Horseshoes	17.50 to 18.00
Railroad brake shoes	15.00 to 15.50

Chicago

CHICAGO, Dec. 7.

With independents on the Industrial Board basis on plates, shapes, bars, sheets, wire products and track supplies, the price ranges which have been peculiar to the market for months have disappeared. It is true that some mills have not yet met the Steel Corporation quotations, but it is believed only a question of time when they, too, will do so. Bolts and nuts have also been marked down sharply, and although cast-iron pipe shops have not yet made any official reductions, going prices are from $9 to $10 below those which they quote. It is not yet apparent what effect recent price reductions will have on the demand. Independent interests state that they are operating on a very close basis, but that they have not had sufficient experience at the new prices to discover whether they can avoid producing at a loss. The immediate effect of price reductions in the case of some producers was to prevent further suspensions through an adjustment of undelivered contracts to the new basis. It is recognized that if no new buying develops it may prove necessary to adjust costs through wage reductions to make possible prices which will induce buying. At present, however, producers are disinclined to alter wages, as it is felt that retail prices have not yet responded sufficiently to make an appreciable difference in the living costs of workmen. That some such action may prove unavoidable at a later date is suggested by the attitude of the railroads toward purchases of rolling stock. Prices on car construction have previously been figured on the basis of Steel Corporation steel prices, and hence the action of the independents in meeting those prices has not changed the situation. The attitude of the carriers is that car prices are too high, being two and one-half to three times those of pre-war days, and if they persist in waiting for lower prices, a further decline in steel may be forced. In this connection it is to be noted that the railroad equipment market is extremely dull. The report of a week ago that the Northern Pacific had purchased 1000 cars was premature, the inquiry still being unclosed.

The pig iron market is weak and unstable. Resale offerings are at such diverse prices that it is difficult to ascertain a ruling range of quotations. It is notable that producers are dropping their quotations toward the resale level, the leading Northern merchant interest having reduced its prices from $46, Chicago furnace, for No. 2 foundry, to $38.

Bar iron mills are rapidly reducing their backlogs, and in the absence of inquiry are for the most part adhering to a nominal quotation of 3.75c., Chicago. Since the bar paragraph below was written, it is learned that one maker will now take business at 3.25c., Chicago.

Operation is on the decline. The leading steel interest is on the same basis as a week ago, while the scale of operations of the foremost independent has been further reduced. The bar iron mill of the Republic company is on a 50-per cent basis, while its Muncie, Ind., bolt and nut plant is operating at about 60 per cent. A third Iroquois merchant iron furnace has blown out, so that of the furnaces represented by the leading seller in this district six are in and four are out.

Ferroalloys.—The market is quiet and prices are indefinite. It is apparent, however, that spiegeleisen is weaker and resale lots are available at from $55 to $60, f.o.b. shipping point.

We quote 75 to 80 per cent ferromanganese; resale, $150 to $160, delivered; 50 per cent ferrosilicon at $80 to $85 delivered; spiegeleisen, 18 to 22 per cent, resale, $55 to $60, furnace.

Plates.—Most makers are now quoting 2.65c. base Pittsburgh, but insufficient time has elapsed since the reduction by the independents to indicate whether it will stimulate buying. The mills were no doubt looking forward to revival of demand when they marked down prices, but probably their immediate purpose was to stop further suspensions and cancellations. For the time being, plates are the weakest finished product, and while the ruling price is exceptionally low in relation to present costs, attractive inquiries might bring out even lower quotations. One independent, in fact, has already quoted at a recession of $1 a ton below the 2.65c. base.

The mill quotation is 2.65c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.78c. for plates out of stock.

Pig Iron.—The market is even less active than a week ago, inquiries for 500 tons of malleable, 500 tons of charcoal and 300 tons of foundry having been withdrawn in the interim. Owing to the paucity of trading, it is exceedingly difficult to ascertain ruling resale prices. Quotations of as low as $35, Chicago, on a resale lot of malleable have been made, and $34, on foundry, but it cannot yet be definitely stated that the market on resale material has receded to that degree. The situation is extremely unstable and the trade has reached a state of mind where no resale quotation, no matter how low, is a source of surprise. It is apparent that many melters are trying to reduce their stocks in the hope of buying later at a still lower price. Others undoubtedly are not only willing but anxious to sustain a loss on iron at this time because computation has demonstrated that by so doing they will fall under a lower rate of assessment on this year's excess profit taxes and actually gain in dollars by the transaction. This incentive may explain some of the low resale quotations which are reported. A large Ohio interest, for example, is offering a substantial tonnage of No. 1 Northern foundry and Southern running from 2.75 to 3.25 per cent silicon at a flat price of $33 f.o.b. plant. It is obvious that resale iron offered because of tax mathematics will be withdrawn after the first of the year. Without giving undue weight to exceptional quotations, the ruling re-

sale prices on Northern foundry seem to range from $36 to $38, base, Chicago, and on Southern foundry from $36 to $38, base, Birmingham. It is notable that furnaces are dropping their prices toward the resale level. The leading Northern seller has reduced quotations to $38, base Chicago furnace, for No 2 foundry and a number of Southern producers are on a basis of $38, base Birmingham. Although resale iron can be bought for less, the furnace quotations are not to be regarded as altogether nominal. In fact, a consumer may find it to his advantage to get on the books of a furnace rather than to pay spot cash for resale material, notwithstanding the fact that the latter is offered at a lower price.

The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton.

Lake Superior charcoal, averaging sil. 1.50 1921 delivery (producers' price, deliv. at Chicago)	$53.50
Lake Superior charcoal, prompt shipment (resale)	51.00
Northern coke, No. 1, sil. 2.25 to 2.75	$37.25 to 39.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25	36.00 to 38.00
Northern high phos	36.00 to 38.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	45.67 to 47.67
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	43.92 to 45.92
Southern foundry, sil. 1.75 to 2.25	42.67 to 44.67
Malleable, not over 2.25 sil	36.50 to 38.50
Basic	36.00 to 38.00
Low phos. Eastern furnace (copper free)	47.00 to 49.00
Silvery, 7 per cent	52.32

Structural Material.—With most mills quoting the Industrial Board prices the trade is on the lookout for signs of business revival. Although aggregate demand is still at a low ebb, it is noteworthy that several building projects which had been held in abeyance are again being seriously considered. Bids have again been asked on an addition to the Michigan Boulevard Building, Chicago, involving 600 tons, and the same is true of the Union Liberty Furniture Co. building, Chicago, involving a like tonnage. Recent fabricating awards include:

Scottish Rite Temple, Oklahoma City, 400 tons, to J. Goldberg & Son, Kansas City.

Moloch Stoker Co., foundry and machine shop, Kaukauna, Wis., 223 tons, to Milwaukee Bridge Co.

American Cement Plaster Co., dryer and crusher building, Grand Rapids, Mich., 201 tons, to Lackawanna Bridge Co.

City of Milwaukee, girders for North Avenue viaduct, 174 tons, to unnamed fabricator.

United Theaters Co., theater and office buildings, Cincinnati, Ohio, 169 tons, to unnamed bidder.

Current inquiries include:

Bascule Bridge, Racine, Wis., 600 tons, bids to be taken Dec. 18.

Two Selwyn theaters, Chicago, 300 tons each, Long Acre Engineering & Construction Co., general contractor.

The mill quotation is 2.45c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.58c. for materials out of warehouse.

Warehouse Prices.—There have been numerous adjustments in warehouse prices recently. Reductions in sheets, bolts, nuts and rivets and cold-rolled bars are recorded under the appropriate paragraphs. Hoops and bands and cold-rolled strip steel have also been marked down. Bands are now uniformly quoted at 4.18c., and one interest is quoting the same price on hoops while others are asking from 4.43c. to 4.68c. Strip steel has dropped from 10.35c. to 8.90c.

Bars.—Nearly all mills are now quoting 2.35c., Pittsburgh, on mild steel bars, but new business is light. Bar iron makers are rapidly reducing their back log, one mill having cut its operations 50 per cent and another having sufficient work ahead to keep it in full operation for two or three weeks more. Producers are still holding to 3.75c., Chicago, and a few small orders are being booked at that quotation, but it is conceded that an attractive inquiry would establish a considerably lower price. The demand for rail carbon steel bars is at a lower ebb and one mill now idle is quoting 2.75c. to 3c., mill.

Mill prices are: Mild steel bars, 2.35c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 3.75c. (nominal), Chicago; rail carbon, 2.75c. to 3c. mill.

Jobbers quote 3.48c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 5.25c. for rounds and 5.75c. for flats, squares and hexagons, an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and under 2000 lb. and an extra 35c. on orders up to 1000 lb. Jobbers quote hard and medium deformed steel barr at 3.48c. base.

Sheets.—The local independent and several mills further East are now meeting the prices of the leading interest. New business is light; in the case of the independents, it has been a margin about 15 per cent of normal. The decline in mill prices has been reflected in a further reduction in independent warehouse quotations, most local jobbers having marked down their prices to 4.68c. for No. 10 blue annealed, 6c. for No. 28 and 7.35c. on No. 28 galvanized. The Illinois Steel Co. warehouse is still quoting less on black, namely, 5.73c.

Mill quotations are 4.35c. for No. 28 black; 3.55c. for No. 10 blue annealed, and 5.70c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 4.68c.; No. 28 black, 5.73c. to 6c.; No. 28 galvanized, 7.35c.

Rails and Track Supplies.—The price policy of the Steel Corporation on rails and track supplies has not yet been announced and in the meantime the leading local independent has reduced its quotations on track bolts and spikes, angle bars and tie plates to the level heretofore adhered to by the foremost interest. In the absence of demand, the local quotations of 3.75c. on iron tie plates has not been tested and must be considered nominal. An Eastern railroad has bought 100,000.

Standard Bessemer rails, $45 to $55; open-hearth rails, $47 to $57. Light rails, 2.45c. to 3c., f.o.b. makers' mills.

Standard railroad spikes, 3.65c., Pittsburgh. Track bolts with square nuts, 4.60c., Pittsburgh. Steel tie plates, 3c. and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron (nominal), 3.75c. f.o.b. makers' mills.

Cast Iron Pipe.—Although no official reductions in quotations have been made, it is apparent that going prices are from $9 to $10 below the nominal market. The prices published below have been marked down accordingly. Business is very light, but it is felt that considerable pending work will be released as soon as purchasers are satisfied with prices. Pipe quotations depend to a large extent on pig iron price and it is variously estimated that iron must drop to from $30 to $35 before pipe can be made attractive to the buyer. Marion, Ill., will let 250 tons of 4-in. to a contractor on Jan. 1.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $78.10 to $79.10; 6-in. and above, $73.10 to $74.10; class A and gas pipe, $4 extra.

Wire Products.—The demand has not been affected by the reductions to the Steel Corporation level recently announced by a few independents. In fact, inquiry has diminished in volume. This is traceable principally to reduced consumption by manufacturers, buying by jobbers still being of generous proportions. Wire nails stand out as the most sought after commodity and the plain wire business is still good. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1583.

Bolts and Nuts.—Most makers have followed the lead of the Cleveland interest in reducing prices. Although producers are still contending with high costs, it is felt that a substantial cut made at one time will have a favorable effect on demand. This seems to be borne out by the fact that a few fair-sized inquiries and orders have already developed, one inquiry calling for 1,500,000 bolts. While the ruling quotations are those published on page 1583, two important interests are quoting 60 off on small rivets and one maker is quoting 50 and 10 off. On small carriage bolts with cut threads one large manufacturer is quoting 50 per cent off, on cold punched black nuts $3.10 off, on cold punched tapped nuts $2.85 off, on large semi-finished nuts 70 and 10 per cent off, on smaller 18 for U. S. standard and 80 and 10 for S. A. E. standard; on tire bolts, 60 and 10. There have been further reductions in jobbers' quota-

tions. For manufacturers' prices, see finished iron and steel, f.o.b. Pittsburgh, page 1583.

Manufacturers quote: Large structural and ship rivets, $4.50 to $4.85; large boiler rivets, $4.60 to $4.95; small rivets, 25 to 60 per cent off; small machine bolts, rolled threads, 40 and 5 off; cut out threads, 30 and 10 off; longer and larger sizes, 30 and 10 to 40 and 5 off; carriage bolts, ⅜-in. by 6-in., smaller and shorter rolled threads, 30 and 10 off; cut threads 30 off; longer and larger sizes, 25 and 10 to 40 off; lag bolts, 45 and 5 to 50 and 10 off; plow bolts, Nos. 1, 2 and 3 heads, 30 off to 50 and 5 off; other style heads, 25 per cent to 20 per cent extra; hot pressed square and hexagon blank nuts, $1.75 to $2 off list; tapped nuts, $1.25 to $1.75 off list; tire bolts, 50 per cent off to 60 and 10 per cent off; track bolts, 6c. to 7c. base. All prices carry standard extra f.o.b. Pittsburgh.

Jobbers quote structural rivets, 5.08c.; boiler rivets, 5.18c.; machine bolts up to ¾ x 4 in., 40 per cent off; larger sizes 30 off; carriage bolts up to ¾ x 6 in., 25 off; larger sizes, 25 off; hot pressed nuts, square tapped and hexagon tapped, 35 off; blank nuts, 85 off; coach or lag screws, gimlet points, square heads, 45 per cent off. Quantity extras are unchanged.

Old Material.—The market is still apathetic, although consumers are taking a little more interest in the market than heretofore. Among purchases by users may be noted several hundred tons of No. 1 cast bought at $20 per gross ton and several hundred tons of railroad malleable bought at $17 per gross ton. The increase in activity, slight as it is, has evidently tended to retard the recession in prices, there being fewer to record than a week ago. Some observers, however, do not look for an early revival of demand on a broad scale, pointing to the diminishing operations of the consumers on the one hand and the increasing offerings of the railroads on the other. In general, the efforts of users are directed towards decreasing their receipts of scrap by rejecting all material which does not meet specifications in all particulars. Railroad lists are numerous and large, offerings probably being the heaviest in four or five years. The Pennsylvania Northwestern region closed yesterday on 3000 tons and the Baltimore & Ohio closes to-day on 20,000 tons. The Union Pacific offers 4000 tons, largely No. 1 rails, the Great Northern 3000 tons, the Pennsylvania Southwestern region 1500 tons, the Soo Line 2000 tons, the Chicago & Eastern Illinois 1000 tons and the Erie a blank list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$27.00 to $27.50
Relaying rails	45.00 to 50.00
Car wheels	27.00 to 27.50
Steel rails, rerolling	17.50 to 18.00
Steel rails, less than 3 ft	18.00 to 18.50
Heavy melting steel	16.50 to 17.00
Frogs, switches and guards, cut apart	16.50 to 17.00
Shoveling steel	16.00 to 16.50
Low phos. heavy melting steel	21.00 to 21.50
Drop forge flashings	13.00 to 13.50
Per Net Ton	
Iron angles and splice bars	26.50 to 27.00
Steel angle bars	16.00 to 16.50
Iron arch bars and transoms	29.00 to 29.50
Iron car axles	32.50 to 33.00
Steel car axles	20.00 to 20.50
No. 1 busheling	15.00 to 15.50
No. 2 busheling	9.50 to 10.00
Cut forge	15.50 to 16.00
Pipes and flues	10.50 to 11.00
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	15.50 to 16.00
Steel knuckles and couplers	16.00 to 16.50
Coil springs	20.00 to 20.50
No. 1 cast	18.50 to 19.50
Low phos. punchings	18.00 to 18.50
Locomotive tires, smooth	12.00 to 13.00
Machine shop turnings	7.50 to 8.00
Cast borings	10.00 to 10.50
Stove plate	21.50 to 22.00
Grate bars	14.50 to 15.00
Brake shoes	11.50 to 12.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	15.00 to 15.50
Country mixed	10.50 to 11.00

The International Motor Co., Allentown, Pa., manufacturer of automobile trucks, is working on a 5-day week schedule; the working hours have been increased from 8 to 9 hrs.

The American Locomotive Co. is operating at about 70 per cent normal capacity at its various plants. It is said that orders on hand total about $40,000,000, insuring about six months' operation at the present rate of production.

Philadelphia

PHILADELPHIA, Dec. 7.

In the ten days since the leading independent steel companies in Pittsburgh and Youngstown announced a reduction in prices on plates, shapes and bars to the level which has been quoted by the Steel Corporation since March 21, 1919, there has been further weakening in practically all products, including other finished steel, bar iron, bolts, nuts and rivets, pig iron and scrap. The whole market is soft. The reduction in prices of pig iron and scrap during the past week has been notable, a sale of 1000 tons or more of basic pig iron by an Eastern maker at a price approximating $35, delivered, being a conspicuous example of the price tendency.

Some makers have now come down to the so-called Industrial Board schedule on wire products, hoops and bands, cold finished steel, sheets and tinplate. Tubular goods and rails are examples, however, of products in which there has been no reduction by the independent producers. All of the independent rail makers are now quoting $57, mill, on open hearth rails.

Eastern independents, with one or two exceptions, have followed the lead of the Pittsburgh and Youngstown companies in dropping to Industrial Board prices on plates, shapes and bars. No business of importance, however, has developed, but instead there has been a steady stream of requests for cancellations or price revisions. The attitude of consumers in thus seeking to escape their obligations is the most disturbing factor in the market. Legal action has resulted in a number of instances, but the mills are apparently loath to institute such actions except in extreme cases.

The Baltimore & Ohio Railroad is reported to have placed orders for a total of 85,000 tons of rails with the Steel Corporation and Bethlehem Steel Co. The board of directors of the Pennsylvania Railroad will meet this week and is expected to authorize final distribution of its rail orders for 1921 delivery. Indications are that the Steel Corporation will get 100,000 tons and the Bethlehem Steel Co. 50,000 tons.

Ferroalloys.—While domestic makers of ferromanganese continue their nominal quotation of $150, seaboard, carloads of resale material have been sold at $125 and $130, seaboard. Spiegeleisen is now available at $60 to $62, furnace. The Marietta furnace of the Lavino Furnace Co., on ferromanganese, will go out of blast in a week or so.

Pig Iron.—The most interesting development in a dull pig iron market is the sale of 1000 tons or more of basic iron to an Eastern plate maker by an Eastern furnace company at a price said to be about $35, delivered. This represents a decline of more than $3 a ton from the price recently quoted on Pittsburgh basic iron for shipment to this district. Pre-inventory offerings of resale foundry iron are fairly numerous. As low as $35, base, furnace, has been done on recent small transactions, and it is evident that a buyer willing to make a firm offer could do much better, possibly close to $30, furnace. Furnace quotations have not dropped below $38, base, furnace, but the market, such as it is, is dominated by resale offerings. Gray forge iron is available at $39 to $40, delivered. Malleable can be had from Buffalo at $37, furnace, with a freight rate to this district of $5.46. Recent sales of copper bearing low phosphorus iron have been at $48, furnace. While there have been no sales of copper free low phosphorus iron, a leading seller in this market names $51, furnace, as a selling price, this being $9 below the price at which last sales were entered. Suspensions of shipment have totaled such a heavy tonnage that several Eastern furnaces will soon reach the end of the orders on which they can make shipments, and it is the present plan of the operators to put such furnaces out of blast until demand for iron is sufficient to justify blowing in again. The Eastern Steel Co. has blown out one of its furnaces and the Midvale Steel & Ordnance Co., which had only one of its three furnaces at Coatesville in blast, put that stack out on Sunday. One of the Wharton furnaces at Wharton, N. J., will be ready in a few

weeks, but will not be lighted until sufficient business has been booked.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace.

East. Pa. No. 2 plain, 1.75 to 2.25	$36.54 to $39.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	37.79 to 40.79
Virginia No. 2 plain, 1.75 to 2.25 sil.	43.74 to 50.74
Virginia No. 2X, 2.25 to 2.75 sil.	44.99 to 51.99
Basic deliv. Eastern Pa.	35.00 to 38.46
Gray forge	39.00 to 40.00
Standard low phos. (f.o.b. furnace)	60.00
Malleable	42.46 to 45.40
Copper bearing low phos. (f.o.b. furnace)	48.00

Warehouse Business.—Effective Dec. 1, jobbers quote steel bars at 3.70c., which means considerable reduction from the Sept. 13 price of 5c. The recent changes took place as follows: Oct. 13, 4.75c.; Nov. 11, 4.10c. Other products have been reduced in proportion. Jobbers claim they could secure good business at 4c. for bars, but are willing to give the public the benefit of as low a reduction as possible. Deliveries from mills are being made faster than warehouse men care to have them. Jobbers are turning in many requests for cancellations, especially where they are tied up with contracts considerably above present mill prices. The mills are handling such requests according to individual merits rather than applying a set policy. One prominent jobber has just received the first direct shipment of Norway iron since before the war. This was six months in transit and landed at Baltimore by mistake. Stocks are complete, but not as heavy as at the first of the year. Prospective buyers send in requests for prices but do not buy freely, apparently wishing to test the market. Collections are difficult. Jobbers quote out of warehouse, per lb. base, the freight from Pittsburgh to Philadelphia being 35c. per 100 lb., as follows:

Soft steel bars and small shapes, 3.70c.; iron bars (except bands), 4.70c.; round edge iron, 4.80c.; round edge steel, iron finish 1½ in. x ½ in., 4.00c.; round edge steel, planished, 4.75c.; tank steel plates, ¼-in. and heavier, 4.00c.; tank steel plates, 3/16-in., 4.40c.; blue annealed steel sheets, No. 10 gage, 5.65c.; light black steel sheets, No. 28 gage, 8.00c.; galvanized sheets, No. 28 gage, 9.50c.; square twisted and deformed steel bars, 3.90c.; structural shapes, 3.80c.; diamond pattern plates, 6.00c.; spring steel, 7.50c.; round cold rolled steel, 5.35c.; squares and hexagons cold rolled steel, 5.85c.; steel hoops, No. 13 gage and lighter, 6.00c.; steel bands, No. 12 gage to 3/16-in. inclusive, 4.65c.; iron bands, 5.50c.; rails, 4.00c.; tool steel, 16.00c.; Norway iron, 12.00c.; toe steel, 6.00c.

Semi-Finished Steel.—While Eastern mills are not urging sales of semi-finished steel, billets can be obtained from Pittsburgh and Youngstown mills at lower prices. Open hearth rerolling billets can be delivered in this district at $49.24 and forging billets at $61.74.

Bolts, Nuts and Rivets.—Following the reduction in prices on bolts, nuts and rivets, reported in this column last week, Eastern makers have again reduced their prices and the latest discounts and net prices are as follows:

Machine bolts, ⅜ x 4 in. and smaller, hot pressed nuts, rolled threads, 60 per cent off; cut threads, 50 and 10 per cent off; large machine bolts, 45 and 5 per cent off; machine bolts, cold punched nuts, ⅜ x 4 in. and smaller, 40, 10 and 5 per cent off; larger sizes, 40 per cent off; carriage bolts, ⅜ x 6 in. and smaller, rolled threads, 40, 10 and 5 per cent off; cut threads, 40 and 5 per cent off; larger sizes, 40 and 5 per cent off; lag screws, 60 per cent off; nuts, hot pressed, blank, 2.25c. off; tapped, 1.75c. off. There is no change on cold punched nuts, which remain at list plus 1c. per lb. The new price on boiler rivets is $4.60 and on structural rivets, $4.50 per 100 lb., Pittsburgh; small tank rivets, 7/16 in. and smaller, 60 per cent off; track bolts, ⅝ in. and smaller, 6.50c. per lb., base; larger diameter, 5.50c. per lb., base.

Finished Iron and Steel.—There is almost no demand for steel products at the reduced prices which are now quoted by nearly all of the independent mills. One Eastern company and a Youngstown company have dropped their prices on sheets to the American Sheet & Tin Plate Co. level; tinplate is available from nearly all makers at $7 per base box; light rails at 2.45c.; hoops and bands at 3.05c.; cold finished steel at 3.60c., and wire products have been reduced by some of the independent makers to the level of the American Steel & Wire Co. Exceptions noted are that one leading independent is asking 3c., Pittsburgh, for shapes under 3 in. and plates 3/16 in. and under, though quoting 2.45c. and 2.65c., Pittsburgh, on large shapes and heavy plates. On bar iron 4c., Pittsburgh, has been shaded on a few transactions.

Old Material.—Further declines in old material prices are noted. One of the Eastern steel companies is offering only $16, delivered, for heavy melting steel. Most of the items quoted below have been reduced from 50c. to $4 a ton below last week's quotations. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$16.00 to $17.00
Steel rails, rerolling	23.00 to 24.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Car wheels	27.00 to 27.50
No. 1 railroad wrought	20.00 to 21.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge fire	14.50 to 15.00
Bundled skeleton	14.50 to 15.00
No. 1 busheling	18.00 to 19.00
No. 2 busheling	14.00 to 15.00
Turnings (short shoveling grade for blast furnace use)	14.00 to 14.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine-shop turnings (for rolling mill and steel works use)	14.00 to 14.50
Heavy axle turnings (or equivalent)	16.00 to 17.00
Cast borings (for rolling mills)	18.00 to 19.00
Cast borings (for chemical plants)	20.00 to 21.00
No. 1 cast	27.00 to 28.00
Railroad grate bars	23.00 to 24.00
Stove plate (for steel plant use)	22.00 to 23.00
Railroad malleable	25.00 to 26.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.00 to 18.00
Iron car axles	30.00 to 31.00
Steel car axles	25.00 to 26.00

EAST PREFERS AMERICAN TRADE

German Competition Sporadic—Requests for Bids on Chinese Railroad Bridge

NEW YORK, Dec. 7.—Export trade in iron, steel and machinery is practically stationary with foreign buyers only inquiring for sufficient material to satisfy immediate needs. German competition in the Dutch East Indies and other Far Eastern markets is sporadic and buyers there evidently have a preference for American material when the price quoted is not too high. A New York exporter recently booked an order from the Dutch East Indies for 50 tons of steel bars at a price based on 2.75c. per lb. Pittsburgh. In China, although there is undoubtedly a preference for dealing with the United States, Japan offers resale material at unusually low prices.

Some exporters believe that the lower prices now being quoted by the independent mills will assist partly toward the resumption of export trade early in 1921. Numerous exporters in New York are offering tonnages of material to domestic buyers at market prices. An improvement in the size and number of orders from South America is expected in some quarters, when there is some evidence of more stable prices, despite the adverse exchange now prevailing with most of these markets. The Italian government on Oct. 29 removed all restrictions on importations of motor trucks.

New Railroad Bridge in China

Through the American commercial attaché at Peking, China, Julean Arnold, it is learned that the Chinese Ministry of Communications is calling for bids for a new railroad bridge over the Hwang-ho (Yellow River) on the Peking-Hankow Railroad to replace the present bridge which is no longer sufficiently strong for the heavy traffic. The present bridge is 9875 ft. long and about 11 ft. above high water. It is of through truss and deck girder construction placed on screw piling. The floor is stringer type filled in with metal plates. The superstructure was fabricated partly in France and partly in Belgium. The proposed bridge will be about 10,000 ft. long, costing between $15,000,000 and $20,000,000. Specifications are now ready at the Ministry of Communications, Peking.

Hours and Wages in Youngstown District

Inauguration of Eight Hour Shifts Being Considered—Possibility of Further Consolidations — Attitude of Foreign Labor

YOUNGSTOWN, OHIO, Dec. 7.—What effect the drive against costs now in full swing in the Mahoning Valley will have upon labor and wage rates is being seriously considered. In view of sharply lowered prices which the independents have been forced to quote, a revision in costs is being worked out and it is the general impression in manufacturing circles that this readjustment must eventually and certainly affect wages and working hours.

Substitution of three eight-hour shifts for the two hour shifts now in operation in most departments is one consideration, while another is the elimination of all overtime wages. At present, time and a half is paid for overtime. Wage retrenchment has already been inaugurated in some departments, particularly plate mills, where premium rates had been in effect with the independent interests. During the stress of the war demand for labor, mills were compelled to pay premium wages to secure workmen and these rates were continued following the war. These have been eliminated, however, effective from Dec. 1.

In some other departments, such as open-hearth furnaces, for instance, where wages have been higher in independent mills for certain operations than the Steel Corporation has been paying, the rates have been equalized.

Eight-Hour Shifts

Elimination of overtime wages would automatically effect a substantial saving in the wage bill, while the inauguration of three eight-hour shifts would do the same thing and at the same time afford employment to a larger number of men during periods of intermittent business. The operating executive of a local interest at one time made a detailed study of the introduction of the 8-hour day into Steel Corporation plants, and estimates it would require about 23 per cent more men to maintain plant operations on an unchanged basis.

Trumbull Steel Co. early this year placed its open-hearth department on a three-shift basis and the plan has worked satisfactorily. The company has also reduced its day labor from a 12-hour to a 10-hour basis, thereby giving it 11 hours pay per day instead of 14 under the overtime arrangement. Employees of the blooming mill and Bessemer department and members of the crews of the sheet mills of the Youngstown Sheet & Tube Co. have been on an eight-hour basis for a considerable time. Many tonnage workers in the industry have worked under the three-shift plan for a number of years.

Interests in close touch with the Steel Corporation are inclined to believe that it is seriously considering the eight-hour day plan.

Throughout this district, common labor is paid the going rate of 46c. an hour in the mills, though in some other Middle Western steel districts the wage rate for this class of labor is from 40 to 42c. per hour. Foreigners prefer the long hours because of the larger wages which they are enabled to earn thereby. Under the existing two-shift arrangement, the division is ordinarily 12 hours days and 12 hours nights, or 10 hours for the day shift and 14 for the night, or 11 for the day turn and 13 for the night, to suit the convenience of the men. Common laborers earn therefore $5.06 for 10 hours or $6.44 for 12 hours, and many of them work every day in the month, under normal conditions.

Foreigners Demand Long Hours

During the past two years, there are many cases on record where foreign-born workmen demanded longer hours or threatened to quit to go with a competing interest where they could work longer and earn more. Some manufacturers object to the institution of the eight-hour day to a large degree because they claim it would produce a shortage of workers in the industry, when operations resume normal. They advance, as an alternative to cut costs, the abolishment of overtime wages.

From expressions which have been increasingly frequent of late, it is believed workers would prefer to accept a wage reduction if they were assured thereby steadier employment.

The belief also prevails in some quarters that wages must eventually be reduced all along the line and the recent statement of the president of the leading company, predicting such action, is interpreted as preparing the men for a readjustment. Salaried men have already been reduced by a number of interests. Some of the smaller, disintegrated concerns have adopted the expedient of laying off all single men, retaining the married men. Others have offered to their employees the alternative of accepting a nominal wage reduction or closing the works, and the workers have invariably preferred the former.

Tonnage men, of course, are affected as prices rise or fall. Substantial declines in rates paid boilers, sheet and tin mill workers during the next six months are expected. For the November-December period puddlers receive $18.76 per ton; sheet mill workers are paid 109½ per cent above base and tin mill employees 95⅝ per cent above base, all of these rates representing the peak. Independent mills usually follow the rates paid under the sliding scale of the Amalgamated Association of Iron, Steel and Tin Workers.

Attention is also being directed by mill managers to cutting costs in other ways and to promoting efficiency. In the past year there has been a substantial increase in per capita production throughout the Mahoning and Shenango Valleys, though it is not yet as high as it should be, in the opinion of leading manufacturers.

Raw material costs are declining, particularly fuel, which is now less than half the prevailing peak prices. Still further reductions may be made and allow the mine operators a fair profit, say steel men. Ferromanganese is on the decline, though it is nowhere near pre-war prices. Whereas before the war it was purchased by Valley interests at $32 a ton, it is now obtainable around $100. During the war, one Valley company paid as high as $200 per ton for it. While freight rates are stationary, there is discussion relative to the means of bringing about a reduction, if possible.

More Consolidation Possible

Some further amalgamation of independent interests, to effect reductions in transportation of ore and coal, are deemed likely if the period of inactive buying in the industry is prolonged. It is pointed out that the independents are wholly at a disadvantage with the Steel Corporation in respect to costs. The coal carrying charges for a Valley interest, for instance, at times during the past summer amounted to $1.58 per ton, in comparison with transportation costs of 15c. per ton to certain Steel Corporation competing plants, which secured their coal by barge. Steel Corporation plants located along the lakes have no additional rail charges for hauling ore, such as the independents located in the interior have, while the transportation charges on ore to interior plants of the major interest are less because it owns and operates its own railroad.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	0.695
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.78
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.33	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.78		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in., angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.45c.

Wire Products

Wire nails, $3.25 to $3.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 to $2 and shorter than 1 in., $2 to $2.50. Bright Bessemer and basic wire, $3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25 as quoted by the American Steel & Wire Co., and No. 8 and heavier, $3.25, the price of the independent makers; galvanized wire, $3.95; galvanized barbed wire, $4.10 to $4.35; galvanized fence staples, $4.20 to $4.45; painted barbed wire, $3.40 to $4.10; polished fence staples, $3.50 to $4; cement-coated nails, per count keg, $2.85 to $3.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 58 to 60½ per cent off list for carload lots, 57 per cent for 1000-rod lots, and 56 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	$4.50
Large boiler rivets	4.60
Small rivets	50 per cent off list
Small machine bolts, rolled threads	60 per cent off list
Same sizes in cut threads	50 and 10 per cent off list
Longer and larger sizes of machine bolts	45 and 5 per cent off list
Carriage bolts, ⅝-in. x 6-in.:	
Smaller and shorter, rolled threads	40, 10 and 5 per cent off list
Cut threads	40 and 5 per cent off list
Longer and larger sizes	40 and 5 per cent off list
Lag bolts	50 per cent off list
Plow bolts Nos. 1, 2 and 3 head	50 and 5 per cent off list
Other style heads	20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅝-in. x 4-in.:	
Smaller and shorter	40, 10 and 5 per cent off list
Longer and larger sizes	40 per cent off list
Hot pressed sq. or hex. blank nuts	$2.25 off list
Tapped nuts	$1.75 off list
C. p. c. & t. sq. or hex. nuts, blank	list
C. p. c. & t. sq. or hex. nuts, tapped	list plus $1.00
Semi-finished hex. nuts, U. S. S. and S. A. E.:	
¼ to 9/16-in. inclusive	70 and 10 to 75 and 10 per cent off list
⅝ to 1 in. inclusive	65 to 70 per cent off list
Stove bolts in packages	70 per cent off list
Stove bolts in bulk	70 and 2½ per cent off list
Tire bolts	50 per cent off list
Track bolts	5.50c. base
Sq. and hex. head cap screws, both rolled and cut threads:	
Milled	50 per cent off list
Upset	55 and 10 per cent off list
Set screws:	
Milled	55 per cent off list
Upset	60 and 5 per cent off list

One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size, or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $57; screw stock rods, $62; rivet and bolt rods and other rods of that character, $57; high carbon rods, $68 to $75, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.65 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $4.50; 5/16-in., $5.25. Boat and barge spikes $4.50 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, $3 to $3.60 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. from mill. Common bar iron, 3.63c. to 4.35c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	47 to 50½	20½ to 24	⅛	15½ to 25½	+1½ to 11¼
½	51 to 54½	36½ to 40	¼	19½ to 29½	1½ to 11½
¾ to 3	54 to 57½	41½ to 44	⅜ to 1½	24½ to 34½	8 to 18¼

Lap Weld

2	47 to 50½	34½ to 38	20½ to 28½	6½ to 14½
2½ to 6	50 to 53½	37½ to 41	22½ to 30½	9½ to 17¼
7 to 12	47 to 50½	33½ to 37	19½ to 27½	6½ to 14¼
13 and 14	37½ to 41			
15	35 to 38½			

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43 to 46½	25½ to 29	¼ +17	+50
½	48 to 51½	35½ to 39	⅜ 13½ to 23½	6½ to+3½
¾ to 1½	52 to 55½	39½ to 43	½ 18½ to 28½	8½ to 18¼
2 to 3	53 to 56½	40½ to 44	¾ to 1½ 24½ to 34½	9½ to 19¼

Lap Weld, extra strong, plain ends

2	45 to 48½	33½ to 37	2 31½ to 29½	8½ to 18½
2½ to 4	48 to 51½	36½ to 40	2½ to 4 23½ to 31½	11½ to 19½
4½ to 6	47 to 50½	35½ to 39	4½ to 6 22½ to 30½	10½ to 18½
7 to 8	43 to 46½	29½ to 33	7 to 8 14½ to 22½	2½ to 10½
9 to 12	38 to 41½	24½ to 28	9 to 12 9½ to 17½	5½ to+2½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ to 1⅞ in.	+ 7 to — 19½	1½ to 1¾ in.	+ 23
2 in.	+ 2 to — 19½	1¾ to 1⅞ in.	+ 20
2¼ to 2½ in.	3 to 30½	2 in.	+ 10 to 15
2¾ to 3¼ in.	11 to 30½	2¼ in.	+ 10 to 13
3½ to 4½ in.	20 to 40½	2½ in.	+ 1 to 10
		2¾ to 3¼ in.	— 1½ to + 3
		3½ to 4½ in.	— 8 to list

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅝ in.	257	2¾ and 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

	Cents Per Lb.
Blue Annealed	
No. 8 and heavier	3.45
Nos. 9 and 10 (base)	3.55
Nos. 11 and 12	3.60
Nos. 13 and 14	3.65
Nos. 15 and 16	3.75
Box Annealed, One Pass Cold Rolled	
Nos. 17 to 21	4.15
Nos. 22 to 24	4.20
Nos. 25 and 26	4.15
No. 27	4.30
No. 28 (base)	4.35
No. 29	4.45
No. 30	4.55
Galvanized Black Sheet Gage	
Nos. 10 and 11	4.70
Nos. 12 to 14	4.80
Nos. 15 and 16	4.95
Nos. 17 to 21	5.10
Nos. 22 to 24	5.25
Nos. 25 and 26	5.40
No. 27	5.55
No. 28 (base)	5.70
No. 29	5.95
No. 30	6.20
Tin-Mill Black Plate	
Nos. 15 and 16	4.15
Nos. 17 to 21	4.20
Nos. 22 to 24	4.25
Nos. 25 to 27	4.30
No. 28 (base)	4.35
No. 29	4.40
No. 30	4.40
Nos. 30½ and 31	4.45

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Dec.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
1	14.00	13.50	33.25	5.12½	5.12½	6.00	5.65
2	14.00	13.50	34.00	5.00	5.00	6.10	5.70
3	14.00	13.75	35.00	5.00	5.00	6.25	6.00
4	14.00	13.75	....	5.00	5.00	6.35	6.10
6	14.00	14.00	34.50	5.00	5.00	6.60	6.25
7	14.00	14.00	35.00	5.00	5.00	6.60	6.25

NEW YORK, Dec. 7.

The tone of nearly all the markets is better and the price tendency is firmer. The copper market is believed to have turned the corner and quotations are firmer. The tin market continues stagnant but is a little higher than a week ago. The lead market has declined to a new low level, but the situation appears more encouraging. The zinc market is decidedly stronger and prices have advanced sharply.

New York

Copper.—While it cannot be said that purchases have increased, the tendency of this market is toward a firmer and steadier condition. The cutting of prices by various interests seems to have stopped and virtually all sellers report a better feeling. While electrolytic copper was sold last week as low as 13.50c. it is difficult to obtain it at less than 14c. to-day, even from dealers or small producers. In fact, it is stated that dealers are turning buyers instead of sellers. We quote both Lake and electrolytic copper for early delivery at 14c., New York, with first quarter, or at least March delivery, at 14.25c.

Tin.—The market continues inactive with very little interest on the part of consumers; even dealers and speculators are indifferent. The only metal that seems salable are cheap lots which are now and then available from one cause or another. The only sale on the New York Metal Exchange in the last week was yesterday when 25 tons of Straits tin, February shipment, was sold at 34.75c. The only new feature of interest is the unconfirmed report to New York papers that the Malay Government had fixed a minimum price for tin, equivalent to £226 per ton c.i.f. New York. This is regarded by some as a bear argument instead of otherwise and as indicating a large stock of tin in the Far East. The quotation for spot Straits, New York, the past week has been slightly higher than a week ago, due largely to speculative buying in London, but there has been no support to the market here. The quotation to-day for spot Straits tin is 35c., New York. In London to-day spot standard tin is quoted at £223 10s. against £207 10s. a week ago; future standard at £227 15s. against £212 a week ago and spot Straits at £224 5s. against £208 a week ago. These prices show the effect of the speculative rebound in London. The deliveries of tin into consumption for the month of November were 3395 tons and on Nov. 30 the stocks were 2741 tons with 725 tons landing. Reports for the first 11 months of this year have been 48,093 tons as compared with 29,956 tons for the first 11 months of 1919.

Lead.—Since last week there have been two reductions by the American Smelting & Refining Co., the first one late on Nov. 30 from 6c. to 5.50c., both New York and St. Louis, and the second on Dec. 3, but not generally known until late on Dec. 4, of ½c. per lb., or from 5.50c. to 5c., both New York and St. Louis. The outside market had already reached this level and, so far as actual business is concerned, has not declined further. There has been a good demand since the 5c. level was reached but it is understood that the independents are not taking much business, although the amount of inquiries is heavy and spread over the first quarter of next year. Resistance to any further decline seems to have set in with practically no further shading of prices. The quotation of both the leading interest and the outside market is 5c., New York and St. Louis.

Zinc.—There has been a distinct rebound in this market, or from 5.60c., St. Louis, a week ago, to 6.25c., St. Louis, to-day, for prime Western for early delivery. The reason for the stronger market is not in any change in the London situation, but is due largely to reluctance on the part of producers here to meet the increased demand which has developed, but which is relatively not large.

Antimony.—Wholesale lots for early delivery are quoted at 5.75c., New York, duty paid, with the market quiet.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is now quoted by the leading interest at 26c. to 27c. f.o.b. producer's plant, while in the outside market the same grade, mostly from foreign sources, is quoted at 24c. to 25c., New York.

Old Metals.—During the early part of the week, the market was very depressed but there was a better feeling toward the close in sympathy with new metals. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.75
Copper, heavy and wire	12.50
Copper, light and bottoms	11.00
Brass, heavy	9.50
Brass, light	7.00
Heavy machine composition	13.00
No. 1 yellow rod brass turnings	7.50
No. 1 red brass or composition turnings	11.00
Lead, heavy	4.00
Lead, tea	3.50
Zinc	4.00

Chicago

Dec. 7.—The market is quiet and prices are uncertain and irregular. Lead has declined to 5.25c, while spelter has advanced from 6.25c to 6.50c. The upward movement in spelter is explained by the fact that smelters have withdrawn from the market because of low prices and, when several good sized inquiries appeared, the available supply was found to be rather restricted. In the old metals lead pipe has declined in sympathy with the new metal. We quote Lake copper at 14.50c in carload lots; tin, 36c.; lead, 5.25c.; spelter, 6.25c. to 6.50c.; antimony, 7.50c. to 8c. On old metal we quote copper wires, crucible shapes, 9c.; copper clips, 9c.; copper bottoms, 7.50c.; red brass, 9c.; yellow brass, 6c.; lead pipe, 3.50c.; zinc, 3c.; pewter, No. 1, 18c.; tinfoil, 20c.; block tin, 25c.; all these being buying prices for less than carload lots.

St. Louis

DEC. 6.—The non-ferrous markets have been quiet with a slightly better tone in zinc, tin and copper. On car lots we quote: Lead, 5.10c.; spelter, 5.85c. On less than car lots: Lead, 5.75c.; spelter, 7c.; tin, 40c.; copper, 15c.; antimony, 7.50c. In the Joplin district there has been little or no change in the ore situation and prices have remained practically unchanged, with lead at $55 per ton, basis 80 per cent; zinc blende, $40 per ton, basis 60 per cent, and calamine $30 per ton, basis 40 per cent. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 5c.; heavy yellow brass, 7c.; heavy red brass and heavy copper, 10c.; light copper, 9c.; pewter, 23c.; tinfoil, 30c.; lead, 4c.; zinc, 5.50c.; tea lead, 3c.; aluminum, 15c.

The Nagle Steel Co., Seyfert, Pa., will soon take out a State charter as a Pennsylvania corporation, to be headed by L. F. Nagle, Edgar H. Heydt and Nicholas M. Carroll. The company is arranging for general business expansion; it is proposed to inaugurate operations at the new sheet and plate mill now being erected at Pottstown, Pa., early in the coming year, specializing in the production of steel plates and annealed sheets for tank and stack construction. Other plants are now being operated at Seyfert and Glasgow, Pa., and at Rahway, N. J.

PERSONAL

Albert C. Mann, formerly vice-president in charge of purchases of International Steel Corporation, 51 Chambers Street, New York, has resigned to become vice-president of the Illinois Central Railroad, including the Yazoo & Mississippi Valley Railroad, with headquarters at Chicago. Wayne Mendell, assistant to the president, has been appointed vice-president and general manager, and Peter C. Mayer who has been a member of the purchasing department for three years and was Mr. Mann's assistant, becomes purchasing agent. Morris Metcalf is president of International Steel Corporation, which is one of the American International group. Mr. Mendell, who as vice-president and general manager now assumes direct charge over all the activities of the business, was born in Moran, Kan., Dec. 22, 1886. His previous experience was centered in steel, hardware and supplies. In 1905, in the midst of the rush to the mid-continent oil fields in Oklahoma, he established a business of his own in the oil district, which business he operated successfully for ten years. He came to New York in 1916, entered the export trade and became associated with International Steel Corporation two years ago.

WAYNE MENDELL

J. M. Henry, assistant research engineer Pratt & Whitney Co., Hartford, Conn., has been transferred to the publicity department of the Niles-Bement-Pond Co., New York. He will also have charge of Pratt & Whitney Co. publicity.

John F. Duffy, formerly Pittsburgh district editorial and business representative of the *Daily Metal Reporter*, has associated with the Ferdinand G. Schultz Co., Jenkins Arcade, Pittsburgh, dealer in ore, iron, fuel and sand.

F. R. Greyson, for the past year with the Lackawanna Steel Co., Buffalo, N. Y., is now with the Cerro de Pasco Copper Corporation at La Fundicion, Peru.

T. A. Russell, president Willys-Overland, Ltd., Toronto, Ont., has announced the appointment of Clayton R. Burt as general manager of the company.

Charles M. Reed, formerly assistant to the steam engineer of the American Sheet & Tin Plate Co., Pittsburgh, has become power engineer for the Portsmouth Cotton Oil Refining Corporation, Portsmouth, Va.

John W. Lees, works manager Inland Steel Co., Indiana Harbor, Ind., since August, 1919, and previous to that with the company for many years as general superintendent and in other capacities, has been elected vice-president in charge of operations with headquarters in Chicago. William A. Maxwell, formerly assistant general superintendent Cambria Steel Co., Johnstown, Pa., has been appointed general superintendent at Indiana Harbor. Previous to his connection with the Cambria company, Mr. Maxwell was superintendent of the open-hearth department, Homestead works, Carnegie Steel Co.

David Moulton, formerly assistant mechanical engineer Monks & Johnson, Boston, is now with the Walworth Mfg. Co., Boston.

F. K. Fawcett, for five years purchasing agent of the Universal Steel Co., Bridgeville, Pa., has resigned to become vice-president and general manager of the Zahniser Mfg. Co., Washington, Pa. This company recently was formed with an authorized capital of $200,000 to take over the business and property in Washington of Zahniser Brothers & Sten, Inc., gray iron castings and oil and gas well tools and supplies. The Waynesburg plant was not included in the deal. George F. Drury is president of the company; E. H. Clover, secretary, and M. R. Zahniser, treasurer. The company plans to increase and improve its manufacturing facilities. It is understood that John Zahniser and associates will continue the operation of the plant in Waynesburg under the name of Zahniser Brothers.

R. A. Seaton, formerly professor of applied mechanics and machine design at the Kansas State Agricultural College, has been appointed dean of the division of engineering and director of the engineering experiment station of the same college.

Henry S. Moos, M.E., has returned to Spain to present to Spanish users American machine tools and machinery. While in America Mr. Moos, in behalf of his associated companies, the American Machinery Corporation, Madrid, and the Sindicato de Maquinaria Americana, Bilbao, made arrangement to represent 40 manufacturers.

Hugh E. Steele, with the machinery sales department of W. R. Grace & Co., importers and exporters, for the past nine years, has resigned to open an office in New York as consultant on machine exporting.

Thomas B. Wilson has been appointed chief steam engineer at the plant of the Bethlehem Steel Co., Sparrows Point, Md. He was formerly steam engineer for the Cambria Steel Co.

C. T. Clack, manager Robert Grant, iron and steel merchant, Woolworth Building, New York, and president Milliken Brothers Mfg. Co. of same address, will leave New York Dec. 18, for a trip around the world in the interest of the first mentioned business. He will sail from San Francisco on the Shinyo Maru to Shanghai, and will visit the leading commercial cities of Japan; later he will go to Hongkong, Manila, Singapore, Batavia, Bangkok, Calcutta and to certain cities in Australia. He will return to New York by way of London and Glasgow. The trip is expected to consume eight to ten months. Robert Grant is now maintaining permanently established offices at Kobe, Shanghai, Calcutta, Batavia, Singapore, London and Glasgow.

Pierre S. du Pont, Wilmington, Del., has been elected president of the General Motors Corporation, Detroit, succeeding W. C. Durant, resigned.

Rufus Longworthy, F. W. Tilden Co., Hinsdale, N. H., founder, has become a member of that company.

F. J. Ryan, president Americal Metallurgical Corporation, Philadelphia, gave an illustrated talk on the "Future of Electric Heat as Applied to the Iron, Brass and Steel Foundry," before the members of the New England Foundrymen's Association, at the Exchange Club, Boston, Dec. 8.

R. E. Chamberlain, Packard Motor Car Co., Detroit, has been promoted to the position of assistant general sales manager.

Martin E. Walker has retired from the McCullough Iron Co., Wilmington, Del., after continuous service of 37 years. He commenced work with the company as a clerk at its Octararo works in Maryland, in 1884, and has occupied positions as office boy, shipping clerk, stenographer, bookkeeper, secretary, vice-president and president, the latter office of which he has filled for the past four years. The company is one of the oldest manufacturers of galvanized sheets in the United States. It commenced making black sheets in 1847, and galvanized sheets in 1852, and has been in continuous operation ever since.

James C. Carlton, formerly with the Thompson Machinery Co., Pittsburgh, joined the sales force of the Sherritt & Stoer Co., machine tools, Philadelphia, on Dec. 1.

Henry F. Pratt has been appointed mid-western sales manager of the Taylor-Wharton Iron & Steel Co. and its subsidiaries, with office at 502 Denham Building, Denver, Colo.

Edwin Elliot and Fred C. Selby have formed a partnership, with offices at 1011 Chestnut Street, Philadelphia, to act as sales engineers, handling accounts for

manufacturers of engineering equipment in Philadelphia and adjacent territory. Mr. Elliot resigned from the Midvale Steel & Ordnance Co. after an association of 21 years, 11 of which were spent in charge of the iron, steel and bronze foundries. Mr. Selby served as purchasing officer of the Emergency Fleet Corporation and was also salvage director.

Edwin Churchill has severed his connection with Churchill-Morgan-Crittsinger, Inc., Worcester, Mass., maker of grinders. The company's name remains the same.

George Hughes, Truscon Steel Co., Youngstown, Ohio, will address the Pittsburgh section of the Association of Iron and Steel Electrical Engineers on Dec. 18 on "Electric Welding, Spot and Butt."

L. R. Smith, president Matthew Addy Steamship & Commerce Corporation, and New York district manager of the Matthew Addy Co., pig iron, sailed on the Lapland on Dec. 4 for a two months' business trip, visiting England, France and Italy.

Clarence A. Earl has resigned as vice-president of the Willys-Overland Co., Toledo, Ohio, and Charles B. Wilson, general manager Wilson Foundry & Machine Co., Pontiac, Mich., has been appointed as his successor.

C. H. Handerson, for the past five years advertising manager of the Cleveland Twist Drill Co., has been appointed publicity manager of the Union Trust Co., Cleveland, and will assume his new duties Jan. 1.

OBITUARY

JOHN DARRACOTTE REYNOLDS, former president of the American Equipment Co., Norristown, Pa. and Mobile, Ala., bolts, nuts and rivets, and of the Georgia & Atlanta Car Co., died suddenly at his home in New York on Dec. 3. He was born in Richmond, Va., and entered business in New York in 1880. Two weeks before his death he wrote his own obituary, though at this time appeared to be in no danger of death.

JAMES PERCY MCNAUGHTON, general sales agent of the Dominion Iron & Steel Co., Ltd., Montreal, Can., for the past 15 years, died Nov. 21.

FRANCIS LYNDE STETSON, New York, senior member of the law firm of Stetson, Jennings & Russell, and long general counsel for the United States Steel Corporation, died Dec. 4 at his home in New York, aged 74. At one time he was a partner of former President Cleveland. He was an officer and director in several railroads.

JOHN WHITFIELD, in the employ of the H. C. Frick Coke Co. for 40 years, for several years in the capacity of assistant superintendent, died at his home in Greensburg, Pa., Dec. 1, of heart disease. He was 64 years old.

BENJAMIN F. TOBIN, chairman of the board Continental Motors Corporation, Detroit, and Muskegon, Mich., died recently. He was born in Chicago Nov. 29, 1865.

EASTERN PIG IRON MEETING

Interesting Comments on British and Continental Blast Furnace Practice

More than 40 members of the Eastern Pig Iron Association attended the meeting in Philadelphia on Friday, Dec. 3. There was the annual election of officers and L. E. Thomas, president Reading Iron Co., Reading, Pa., was chosen as president of the association, succeeding Charles M. Smith, New York, president Colonial Iron Co., Riddlesburg, Pa. W. S. Pilling, who has been secretary for many years, was re-elected. At the luncheon, which was held at the Bellevue-Stratford, Herman A. Brassert, of Freyn-Brassert & Co., Chicago, made an interesting address covering some of his observations on a trip to Europe. He visited iron and steel works, particularly blast furnaces, in Great Britain and in several Continental countries. Mr. Brassert's firm has a contract for the building of two blast furnaces at Ijmuiden, Holland, for the Royal Netherlands Blast Furnace & Steel Works Co. Coal deposits recently developed in Holland extend over into Belgium. The new company will bring ore from Spain, Scandinavia and possibly from Newfoundland. It has a connection with the Phoenix Works in Duisburg-Ruhrort, and will send pig iron to the latter in exchange for finished steel. Holland is determined not to be without a pig iron supply as was the case for many months in the great war.

There was, naturally, competition from the Continent for the Dutch blast furnace contract and the alternative of the latest American design was the heavy construction which has obtained in Luxemburg and Lorraine in the furnaces erected in recent years. The Luxemburg design would have meant about 4800 tons of steel for the two Dutch furnaces, whereas the Chicago firm's plans will require only 2700 tons of steel. According to the Chicago plans, no part of the essential construction is lighter than that proposed by the Continental engineers, but the latter provided enormous bins, with four tracks for their ore and coke cars, while the buckets carried 11 tons and the skip hoists and top work were far heavier than are found necessary in this country.

Mr. Brassert found that at a good many British blast furnaces where the output was less than half, and in many cases less than one-third that of a modern American furnace much attention was paid to the refinements of gas cleaning. In many cases elaborate bag cleaner systems, involving with accessories a cost of several hundred thousand dollars, had been installed, and the cleaning of gas for the gas engines was carried to the point of making it freer from dust than the air. The British blast furnacemen have great fear of ore fines, and with the long pipe lines common at British furnaces and the low blast pressure, often not more than 6 lb., there is a constant liability to "hang" when using fine or crushed ore. While American blast furnacemen are using successfully high percentages of comminuted ore it is common in Great Britain to charge great lumps of ore, often as much as 3 ft. in diameter. It is common also to use large buckets, charging 11 tons of coke at a time. With the alternation of 22 tons of ore and with the presence of large lumps the distribution of the burden is not such as to secure easy working of the furnace. In contrast great study has been given in this country to the matter of distribution.

Coke oven practice at most British works did not reach the degree of efficiency attained in the United States. Hand labor was employed at furnaces for carefully forking coke into buckets, and generally at no little expense great care is taken to guard against it being broken—something American blast furnacemen do not have to reckon with, as practice here gives coke that is not seriously broken up by mechanical handling.

Mr. Brassert found that operating men at British blast furnaces were alive to the desirability of increasing output to something like the American standards, but one great obstacle to the adoption of improvements was the presence on boards of directors of so many men lacking in appreciation of operating conditions. Cases were known in which British engineers had toured the United States and had been favorably impressed by blast furnace practice here, but were unable to transfer their own enthusiasm for American results to their boards of directors.

Following Mr. Brassert's address some remarks on present and future iron trade conditions were made by A. I. Findley, editor of THE IRON AGE.

IRON AND INDUSTRIAL STOCKS

Gradual Building Up of Bank Reserves Helps Market for Securities

The gradual building up of bank reserves has created a more hopeful feeling in business circles notwithstanding the fact that the downward readjustment in commodity prices goes on unchecked. This feeling is reflected in recent quotations for iron and industrial stocks, fairly substantial recoveries being noted in the most conspicuous issues. With the prospect of the Government borrowing $500,000,000 within the near future, and with tax, dividend and interest disbursements in order, the prospects for cheap money within the next month are not especially bright, yet the feeling exists in financial centers that the worst of the money strain has passed.

Recoveries in prices for steel stocks have not been as pronounced as those in allied securities such as locomobile and equipment issues, due, no doubt, to a further reduction in average prices for iron and steel products, and to the comparatively small tonnage of forward business being booked by mills. Midvale Steel has been more backward than most of the other large company stocks. Talk of a merger of certain independent steel properties has been revived with the improvement in the stock market. The statement that a large tonnage of rails will be purchased in 1921 has created an impression that heavy investments in equipment will follow, which probably accounts for the better character of recent buying of equipment shares.

The range of prices on active iron and industrial stocks from Saturday of last week to Monday of this week was as follows:

Allis-Chalm. com.	29½ - 31¼	Int. Har. pf.	103 -104⅝
Allis-Chalm. pf.	.. - 73	Lackawanna Stl.	51½ - 56½
Am. Can. com.	25¼ - 26⅜	Lake Sup. Corp.	8⅝ - 9
Am. Can. pf.	80 - 81¼	Midvale Steel	31⅝ - 33
Am. C. & F. com.	122¾ -126½	Nat-Acme	29 - 30
Am. C. & F. pf.	.. -109	Nat. E. & S. com.	46¾ - 50½
Am. Loco. com.	83¾ - 87⅛	N. Y. Air Brake.	86 - 88
Am. Loco. pf.	.. -101	Nova Scotia Stl.	37 - 38½
Am. Radiator cm.	68 - 70	Press. Steel com.	82½ - 84¼
Am. Stl. F. com.	29⅜ - 33¾	Ry. Stl. Spg. com.	85 - 86½
Ah. Stl. F. pf.	.. - 84	Ry Stl. Spg. pf.	102½-104
Bald. Loco. com.	94½ - 98¼	Replogle Steel	66 - 74¼
Bald. Loco. pf.	95 - 98	Republic com.	65 - 69⅝
Beth. Steel com.	53 - 56¼	Republic pf.	90⅜ - 91
Beth. Stl. Cl. B.	52½ - 56¾	Sloss com.	53½ - 55
Beth. Stl. 8% pf.	101 -104½	Superior Steel	41 - 45
Case, J. I. pf.	84 - 85⅛	Transue-Will.	41 -41¾
Chic. Pneu. Tool.	66 - 70	Un. Alloy Steel	32½ - 33
Colo. Fuel.	28⅞ - 29⅝	U. S. Pipe pf.	11½ - 12
Cruc. Steel com.	87 - 97½	U. S. Pipe com.	41¾ - 43¾
Cruc. Steel pf.	87 - 87½	U. S. Steel com.	79¾ - 83¼
Gen. Electric.	126 -129½	U. S. Steel pf.	106 -107
Gt. No. Ore cert.	29½ - 30½	Vanadium Steel	39¾ - 44⅞
Gulf States Stl.	35 - 35¼	Va. I. C. & Coke.	.. - 90
Int. Har. com.	94 - 98	Westingh. Elec.	41⅞ - 44⅜

Statement of Truscon Steel Co.

Total assets of the Truscon Steel Co., Youngstown, Ohio, are $12,659,493.08, according to a statement issued for the 12-month period ending Sept. 30. In that time, the company earned the dividend on its preferred stock about 14 times. The balance sheet shows that the company has $2,500,000 of preferred on a 7 per cent yearly basis.

"A large percentage of the earnings have been reinvested in the business," reads the statement. "The Truscon Steel Co. is turning over its invested capital about five times a year. A rapid turn-over of this kind means that inventory losses must necessarily be comparatively low. In addition, sales for future delivery are largely on specification orders and are not subject to cancellation, which is a further protection against loss."

In its statement of assets, the company lists cash, merchandise, accounts receivable and Liberty bonds at $8,091,150.65; real estate and buildings at $1,546,679.45; machinery and fixtures at $2,022,882.11; stock in foreign companies at $309,432.34, and treasury stock at $565,700.

Deductions for Losses

A very clear interpretation of the Federal revenue law, especially with regard to the deductions for losses in income tax statements, has just been made by James Francis Burke, general counsel of the Pittsburgh Chamber of Commerce. The assertion was made a short time ago by an Eastern publication that business men could not deduct losses sustained outside their immediate business. This impelled the request for an opinion on the matter from the Chamber of Commerce from Mr. Burke. The latter says:

"The Federal revenue act as it now stands clearly confers upon everyone losing money in a legitimate transaction entered into for profit, whether in the immediate line of one's business or not, the right to deduct that loss from this year's income, provided it is a closed and determined transaction. However, this does not allow the deduction of all losses suffered in all transactions, regardless of character, but only transactions which have been entered into for profit. A loss sustained from the sale of one's residence, for instance, is not deductable.

"The impression in the public mind and no doubt responsible for the publication to the effect that this right of deduction ended with the year 1919, probably arises from the fact that certain losses on inventories, which might be set off in one year as against profits in another, applied only to the period beginning in October, 1918, and ending Jan. 1, 1920. Regarding this latter provision, the country now realizes that the law fell short of the purpose, as the anticipated depreciation in after-war inventories did not occur in 1919, but did occur in 1920. The result is so serious in many cases that mature consideration must be given the matter by Congress in order to avoid grave injustice to the business world. The condition of the National treasury, on the other hand, makes the granting of relief to the business world a problem unusually perplexing."

Industrial Finances

Liabilities of $24,000,000, assets of $20,000,000 and a deficit of $4,000,000 were roughly the figures laid before the creditors of Nathan Brenner & Co., metal brokers, with offices in the Excelsior Life Building, Toronto, Ont., at a meeting in the offices of Assignee Osler Wade, 32 Front Street. The date of the assignment was Nov. 10. It was brought out that the suspension of the company was the outcome of the sensational slump in recent months in steel futures as well as in foreign exchange.

Truscon Steel Co., Youngstown, Ohio, has declared regular quarterly dividend of 1¾ per cent on preferred stock, payable Dec. 20 to holders of record Nov. 20.

At a recent meeting of the stockholders of the Jacquet Motor Corporation of America it was voted to raise the capital stock from $100,000 to $250,000, to enable the company to secure additional funds to take care of its future business.

George W. Perks, Akron, Ohio, has been appointed receiver of the Canton Auto Parts Co., Canton. Two suits were brought for receivership, one by a creditor and the other by three members of the board of directors.

The Temple Furnace of the Seaboard Steel & Manganese Corporation, Reading, Pa., will be offered for sale on Dec. 20 by Robert J. Sterrett, special master appointed by the United States District Court to dispose of the property, in equity proceedings of the Guaranty Trust Co., New York. At a recent offering of the property, no bids were received.

The Penn Seaboard Steel Corporation, 111 Broadway, New York, has arranged for the sale of a block of three-year notes. The company recently increased its capital to $1,750,000. James B. Warren is president.

Ernest Whitbeck has been appointed receiver for the L. W. F. Engineering Co., College Point, L. I., manufacturer of aircraft and parts. The company was organized in 1915 with capital of $1,000,000, and was one of the pioneers in this line of production. The plant occupies five city blocks and is said to be the largest of its kind in the country; during the war period operations were concentrated upon war planes for the Government, giving employment to about 2200 persons. Since this time the company has been manufacturing a large number of airplanes and parts for the aerial mail service. It is said that the receivership is due to the failure of the Government to develop and adopt a definite aeronautical program. J. M. Fitzgerald is president; A. H. Flint, vice-president; and W. N. Bennett, secretary.

OFFICE CHANGES

The Verdin, Kappes & Verdin Co. has removed its quarters to the newly completed factory building at 108-110 West Second Street, Cincinnati.

The Safety Equipment Service Co., 215 Saint Clair Avenue, Cleveland, has moved to East Eleventh Street and Hamilton Avenue, Cleveland.

The office of the Duquesne Steel Products Co., western Pennsylvania representative of the Superior Sheet Steel Co., Canton, Ohio, has been removed from 609 Oliver Building to room 411 in the same building.

Machinery Markets and News of the Works

NO IMPROVEMENT

Machine Tool Business Continues Dull

Many Quotations Have Been Made, but Orders Are Not Being Placed in Volume

There has been no increase in machine-tool business. The various selling centers report substantially the same condition of extreme dullness. Many quotations have been made, but in nearly every instance prospective buyers are postponing purchases until next year.

A maker of single and multiple spindle sensitive drilling machines has reduced prices 5 per cent, but otherwise there are no changes reported in machine-tool prices.

Curtailment of production continues. In the Cincinnati district several plants have laid off 25 per cent of their forces and others have reduced the number of working hours per week to 30.

Among some of the fairly large inquiries before the trade is that of the Ohio Locomotive Crane Co., Bucyrus, Ohio, for 53 tools, which may be acted upon soon. The International Harvester Co. is in the market for 25 gear generators and 10 thread milling machines for its Milwaukee plant and the Allis-Chalmers Mfg. Co., Milwaukee, has an inquiry out for a miscellaneous list of equipment. The Chicago, Rock Island & Pacific Railroad still has several tools to buy.

New York

NEW YORK, Dec. 7.

The local machine-tool trade is resigned to the possibility that there will be no improvement in business until after the first of the year. Some of the large prospective buyers, such as the General Electric Co. and a few of the Eastern railroads, have definitely stated that their proposed purchases will be held up until January or later. Some predict it will be spring before there is any active buying.

November was a very poor month in point of sales, but some sellers of tools have made a surprisingly large number of quotations, considering the general dullness of the market. It is admitted in most cases by prospective purchasers that these quotations are either for inventory purposes or for contemplated buying early next year.

The crane market continues quiet but numerous inquiries for estimating purposes that have been issued by the railroads—the Pennsylvania and the New York Central & Hudson River Railroad—seem to portend good business from this source in 1921. Inquiry for locomotive, hand power and electric cranes is active with few sales reported.

Among recent sales are: Shepard Electric Crane & Hoist Co., an 11-ton, 80-ft. span, 5-motor bucket crane with 4-cu. yd. capacity to the Chemical Construction Co., New York, for Wilson & Tommes, Jacksonville, Fla.; Chisholm-Moore Mfg. Co., 4-ton, 35-ft. span, double I beam hand power crane to W. R. Grace & Co. for Chile; Browning Co., 15-ton locomotive crane to the American Can Co., New York. Witherbee, Sherman & Co., New York, have purchased a 15-ton Brownhoist locomotive crane, second-hand, from the General Equipment Co., New York, for Port Henry, N. Y.

The Walter Motor Truck Co., 243 West Sixty-first Street, New York, manufacturer of automobile trucks, has awarded contract to the H. K. Ferguson Co., 6523 Euclid Avenue, Cleveland, for a new one-story brick and steel plant, 100 x 300 ft., on Fulton Street, Poughkeepsie, N. Y., to cost about $100,000, including equipment.

The Van Kannel Corporation, New York, has been incorporated with an active capital of $100,000 by C. Carrington, J. F. Blanchard and H. C. Stiner, 250 West Fifty-fourth Street, to manufacture door operating devices and other mechanical equipment.

The Universal Starlight Signal Corporation, New York, has been incorporated with a capital of $1,000,000 by S. D. Kessler, H. M. Schemme and E. E. Fuchs, 310 West Ninety-ninth Street, to manufacture automobile signals and other devices.

The Marmon Automobile Co., 1876 Broadway, New York, manufacturer of pleasure automobiles, has increased its capital from $325,000 to $975,000.

The American Foreign Steel Corporation, New York, has been incorporated with a capital of $500,000 by A. W. Schwartz, N. W. Kerngood and J. J. Finnegan, 233 Broadway, to manufacture iron and steel products.

The Nu Era Paper Co., Hadley, N. Y., has filed plans for an addition to its machine shop to cost about $100,000, including improvements in the present building.

The Special Motor & Machine Works, New York, has been incorporated with a capital of $30,000 by F. F. Baum, J. W. Brautigan and C. R. Baird, 24 East Twenty-third Street, to manufacture electrical and mechanical equipment.

The James A. Coffey Engineering Corporation, Esopus, N. Y., has been incorporated with a capital of $50,000 by B. T. Adams, F. Blen and J. L. Frieder, 280 Broadway, New York, to manufacture mechanical equipment.

The Exide Battery Depots, Inc., 101 West End Avenue, New York, a subsidiary of the Electric Storage Battery Co., Nineteenth and Allegheny streets, Philadelphia, has filed plans for a two-story works at Spring and Clark streets, to cost about $115,000, including equipment.

The Brevard Electrical Corporation, New York, has been incorporated with a capital of $200,000, by P. Brevard, F. L. and W. H. Reid, 128 Broadway, to manufacture electrical equipment.

Shapiro & Aronson, 20 Warren Street, New York, manufacturers of gas equipment, lighting fixtures, etc., have filed plans for a one-story addition on Glenmore Avenue, Brooklyn, to cost about $50,000. It will be 100 x 200 ft.

The H. & D. Motors Co., New York, has been incorporated with a capital of $500,000 by A. A. Hayes, G. F. McKay and C. J. Cahill, 370 Manhattan Avenue, to manufacture automobiles and parts.

The Flashwriter Co., Troy, N. Y., has been incorporated with a capital of $100,000 by A. V. Cooper, W. A. and A. M. Butler, Troy, to manufacture special typewriting devices and parts.

The Valeno Co., Yonkers, N. Y., has been incorporated with a capital of $1,600,000 by Charles A. Valentine, Phillip Loff and Roland E. Belknap, Yonkers, to manufacture talking machines and parts.

The New York Air Brake Co., 165 Broadway, New York, contemplates the purchase of equipment for installation at its plant at Watertown, N. Y.

The Deschanel Engineering Co., 90 West Street, New York, has increased its capital from $50,000 to $150,000.

The Standard Oil Co. of New York, 26 Broadway, New York, will commence erection immediately of a new power house at its works at Albany, N. Y.

The Griffiths Sales Co., New York, has been incorporated with a capital of $50,000 by F. W. Doty, F. J. Page and J. H. Olson, 1328 Broadway, to manufacture electrical and gas appliances.

William Vogel & Brothers, Inc., 37 South Ninth Street, Brooklyn, manufacturer of metal products, has perfected arrangements for the operation of a department for the manufacture of cans and containers.

The Bilt-Well Lighting Fixture Co., New York, has been incorporated with a capital of $25,000 by J and H. J. Glassberg, 87 Manhattan Street, to manufacture metal gas and electric fixtures.

H. J. Brandels, 435 Lafayette Street, Utica, N. Y., has filed plans for the erection of a one-story machine shop on Lafayette Street, to cost about $19,000.

The American Graphite Co., Ticonderoga, N. Y., has

awarded a contract to Charles Malone, Port Henry, N. Y., for a two-story addition, 60 x 85 ft., to cost about $45,000.

The Connelly Iron Sponge & Governor Co., 227 Fulton Street, New York, a New Jersey corporation with plant at Elizabethport, has increased its capital from $100,000 to $400,000.

The Burlock Non-Skid Tire Corporation, Nyack, N. Y., has been incorporated with a capital of $250,000 by James E. Burlock, Charles E. Speigel and Walter D. Beardsley, Nyack, to manufacture automobile tires.

The Art Metal Construction Co., Jamestown, N. Y., manufacturer of metal office furniture and filing equipment, has acquired the five-story building at 369 Broadway, New York, extending through to Franklin Alley, for new local headquarters.

The Withington-Hunting Co., Inc., New York, has been incorporated with a capital of $150,000 to manufacture machinery and parts for motion picture work. H. W. Withington, 214 West Thirty-fourth Street, is the principal incorporator.

The Smith Rubber & Tire Co., Midland Avenue, Garfield, N. J., is planning to build a second unit to its plant. It has a six-acre site, fronting on the Erie Railroad, and the new unit will closely approximate in size the first, which is two stories, 60 x 200 ft. The new factory will be operated as a by-product works for the tire end of the business. The company was recently organized with a capital of $10,000,000, and has arranged for a stock issue of $1,000,000, to carry out the different features of the new plant, and for general expansion. Winfield Clearwater is president, and James H. Aldred, general superintendent. New York offices are at 5 Columbus Circle.

The Sixteenth Street Garage Corporation, New York, recently organized, has leased the five-story and basement building at 335-37 West Sixteenth Street, for a new automobile service and repair works. The structure will be remodeled at a cost of about $100,000.

The Bayonne Guarantee Radiator & Metal Co., 712 Broadway, Bayonne, N. J., has filed notice of organization to manufacture radiators, boiler equipment, etc. George Katzman heads the company.

The American Automobile Radiator Co., Perth Amboy, N. J., has filed notice of organization to manufacture sheet metal products. Nathan M. Goldman, 181-A New Brunswick Avenue, heads the company.

The Penn Metal Co., 94 First Street, Jersey City, N. J., has filed notice of change of name to the New York Iron Roofing & Corrugating Co.

The Jackson Railway Signal Co., Manasquan, N. J., has been incorporated with a capital of $100,000 by George B. Jackson, J. Harrington Sickel and J. S. VanSchoick, to manufacture railroad signals and devices.

The Beckley Perforating Co., North Avenue, Garwood, N. J., manufacturer of perforated metals, revolving and shaking screens, etc., has increased its capital from $100,000 to $250,000.

The Tiffany Electric Co., East Orange, N. J., has been incorporated with a capital of $30,000 by Walter A. Morton, Harold Brangs and Earl H. Tiffany, 422 North Walnut Street, to manufacture electrical specialties.

The Jephson-Scott Body Co., 24 Sterling Street, East Orange, N. J., manufacturer of automobile bodies, is arranging a list of equipment for its two-story and basement addition, 58 x 63 ft., plans for which have been completed. It will cost about $70,000. Marshall N. Shoemaker, 15 Central Avenue, Newark, is architect.

The Tubular Seal & Box Co., Guttenburg, N. J., has been incorporated with a capital of $50,000 by Charles Kronenberg and Anton J. Paroubek, 428 Twenty-fourth Street, to manufacture machinery for the production of metal seals, containers, etc.

The Schranz & Bieber Co., Jersey City, N. J., manufacturer of toys, etc., has acquired the building now occupied at 362-66 Hoboken Avenue. It is three stories and basement, 65 x 150 ft., and the new owner plans for the erection of additional floors and other improvements for increased manufacture.

The Star Auto Top Co., 264 Halsey Street, Newark, has filed notice of organization to manufacture automobile tops and frames, and other motor car accessories. Raphael Lewis, 196 South Tenth Street, heads the company.

The Deslauries Column Mould Co., 46 Pollack Avenue, Jersey City, N. J., has filed plans for a new one-story machine shop.

The Efficient Electric Protection Co., Newark, has been incorporated with a capital of $50,000 by Frank Silken, M. and Harry Dvorken, 86 Jefferson Street, to manufacture electrical products.

The Hochbaum-Rylander Electric Co., 539 Central Avenue, Newark, manufacturer of electrical products, has filed notice of dissolution under State laws. Frederick Hochbaum is head.

The Wire Wheel Repair & Sales Co., 284 Halsey Street, Newark, has been organized to manufacture wire wheel parts for automobile and other service, and to operate a general mechanical repair works. Monte Freund, 158 Dean Street, Brooklyn, heads the company.

The Old Hickory Tire Co., Newark, has been incorporated with a capital of $3,500,000 by John Q. Frey, John D. Fischbeck and Francis Child, 790 Broad Street, to manufacture automobile tires and other rubber products.

The Tide Water Oil Co., 11 Broadway, New York, with plant at Constable Hook, Bayonne, N. J., is planning for the establishment of new works in the vicinity of the Clay Street bridge, Passaic River, Newark.

The Perfection Machine & Mfg. Works, Inc., Newark, has been incorporated with a capital of $100,000 by Samuel Clare, Isadore Kolker, and Harry Charmoy, 180 Hillside Avenue, to manufacture machinery and tools.

The Stiehl-Hoppe Co., 49 Blum Street, Newark, has filed notice of organization to manufacture cutlery, and similar products. Paul Stiehl and P. H. A. Hoppe head the company.

New England

BOSTON, Dec. 6.

The machine tool market is at a standstill. November was the poorest month of the year, sales showing an abrupt drop from October. The trade, however, is not as pessimistic as might be expected, due to assurances from customers that purchases of equipment will be made soon after the first of the year.

The present condition of the market is due to a certain extent to a slowing up in the textile machinery industry from which business has been expected. In addition the General Electric Co., West Lynn, Mass., has extended its 1920 requirements into the 1921 budget, pending a readjustment of the credit situation, and concerns largely engaged in parts work have not recovered from the slump in the automobile industry. There is, perhaps, a little more activity in public utility improvements which possibly will result in some equipment orders before Jan. 1.

Among New England machine tool manufacturers in general, curtailment in the form of reduced operating hours or in the number of employees is noted. There are instances where plants are operated at not more than 33⅓ per cent of capacity, but these are exceptions. A concerted effort is being made, however, to keep organizations intact as much as possible. Some report an accumulation of usually active tools, but such stocks are not excessive. As a rule manufacturers are devoting more time to the production of parts than to completed machinery.

The Edison Electric Illuminating Co., Boston, will erect an addition to its South Boston plant. Full details have not been worked out, but excavation has begun on part of the property.

Horatio R. Nightingale, Nightingale, Baker & Salisbury, Providence, R. I., iron and steel, has purchased 13,599 ft. of land on West Exchange Street, on which will be erected a one-story, 60 x 200 ft., saw-tooth roof, warehouse, equipped with electric cranes and hoists, metal cutting machinery, etc.

The Interstate Foundries Corporation, Boston, capitalized for $150,000, recently was incorporated under Massachusetts laws. It has no definite information at this time to give relative to its location, although several existing plants are under consideration. A temporary office is maintained at Pemberton Square, Boston. Herbert Austin, Fall River, is president and Junius P. Sokoll, treasurer.

The Pittsfield Electric Co., Pittsfield, Mass., contemplates the erection of several additions to its plant. Details have not yet been worked out.

The Sexton Can Co., Everett, Mass., has awarded contract for an addition. It is producing approximately 1,000,000 cans annually and recently purchased some machine shop equipment.

E. A. Ormsby, Melrose, Mass., contemplates the erection of a machine shop, garage and office building in the next few months.

The Fidelis Phonograph Corporation, Augusta, Me., has postponed until spring, its proposed four-story addition.

Work has been started on a hydroelectric plant to cost about $150,000 at East Lee, Mass., for the Tayford Co., New York.

Two additions, 40 x 80 ft., two stories, and 50 x 60 ft., one story are being made to the plant of Whiting & Davis, Plainville, Conn., silver, etc.

Instead of a machine shop, as previously noted, the Fitchburg Gas & Electric Co., Fitchburg, Mass., will build a repair shop, in addition to other improvements.

The Worcester Nut Co., Worcester, recently incorporated under Massachusetts laws, is established on the second floor of 85 Foster Street. Albert W. Larson is president and Harry W. Goddard, treasurer.

The Spafford Machine Screw Works, Hartford, Conn., has bought additional land, 100 x 110 ft. on the east side of Francis Avenue, on which it is planned to build within the next year. It recently purchased several new automatic machine tools.

E. A. Eddy, E. A. Eddy Machinery Co., Providence, R. I., has purchased the Cove Street Machine Shop, a two-and-one-half-story wooden structure, at Weybosset and Burrell streets. No immediate change is contemplated as it is under lease to the Starkweather & Williams Co.

The stock of supplies, machinery and equipment; buildings, real estate and the milling machine and grinder business of the Bristol Machine Tool Co., Bristol, Conn., will be sold at public auction at the offices of the company at 10 a.m., Dec. 18. The property will be open for inspection from Dec. 13 to Dec. 17, inclusive.

The Hartford Mfg. Corporation, Hartford, Conn., has been incorporated with a capital of $50,000 by H. J. Beardsley, L. B. Sherwood and H. B. Herrup, 647 Main Street, to manufacture machinery and tools.

The Boston Elevated Railway Co., 108 Massachusetts Avenue, Boston, has made application for permission to issue bonds for $4,421,000, the proceeds to be used for new repair shops at Everett, Mass., and other improvements. Dwight P. Robinson & Co., 125 East Forty-sixth Street, New York, are the engineers.

The Geometric Tool Co., New Haven, Conn., manufacturer of tools, dies, etc., has increased its capital from $100,000 to $1,000,000.

The Hackett Products Co., Inc., Providence, R. I., has been incorporated with a capital stock of 120 shares, without par value, to manufacture machinery and parts. The incorporators are B. G. Hackett, T. R. Kilkenny, and Frank L. Reilly, 141 Bluff Avenue, Cranston, R. I.

The United Metal Bed Co., 300 Cambridge Street, Boston, has filed notice of organization to manufacture metal bedsteads. George Fish heads the company.

The N. O. & O. Machine Co., Ansonia, Conn., has filed final certificate of dissolution under State laws.

The E. Ingraham Co., Bristol, Conn., manufacturer of clock movements, will build a one-story extension to its factory on North Main Street.

The plant and equipment of the Mayo Radiator Division of the Marlin-Rockwell Corporation, Willow Street, New Haven, Conn., manufacturer of automobile radiators, will be sold at public auction.

The American Machinery & Equipment Co., Newington, Conn., has been incorporated with a capital of $500,000 by M. E. Pierson, Newington; Peter King, 104 Laurel Street, Bristol, Conn., and C. F. Roberts, 902 Chapel Street, New Haven, Conn., to manufacture machinery and parts, including tractor equipment.

The Skinner Chuck Co., New Britain, Conn., manufacturer of chucks and other machine specialties, has filed notice of increase in capital from $225,000 to $750,000.

Bird & Son, Inc., East Walpole, Mass., manufacturer of roofing products, is having plans prepared for the erection of a one-story brick and concrete addition, 50 x 200 ft. C. T. Main, 201 Devonshire Street, Boston, is engineer.

The Rogers Faucet Co., 36 River Street, Bridgeport, Conn., recently organized, has arranged for the immediate manufacture of a new type of water faucet, operating under water pressure and not by compression. It proposes to develop its facilities to provide for the production of a complete line of water faucets, including a special self-closing type, without springs. John Rogers is president and treasurer; Charles W. Fotch, secretary and manager, will also act as factory superintendent.

The Boston Structural Steel Co., Cambridge, Mass., has acquired the plant and patents of the Nelson Instrument Co., Elkins Street, South Boston, a subsidiary of the Nelson Blower & Furnace Co., specializing in the manufacture of speedometers and other precision equipment.

Chicago

CHICAGO, Dec. 6.

The status of the local market remains substantially unchanged. Sales totals for November average about those for the previous month, and the first week of December has shown no increase. Notwithstanding the effect on consumers of recent reductions in prices by independent steel makers, machine tool builders are holding firmly to the present quotations on their products. It is pointed out that materials make up but a small part of the cost of machine tools and that a change in labor costs is not in sight.

While current bookings of dealers are light, a few sizable orders have been taken. One seller sold three brass working turret lathes and a valve milling machine to the Fisher Governor Co., Marshalltown, Iowa, and a double head key lathe to Peter Healy, founder, Evansville, Ind. Several attractive inquiries have appeared on which action is expected after the first of the year. The International Harvester Co. is in the market for 25 gear generators and 10 thread milling machines for its Milwaukee plant and the Allis-Chalmers Mfg. Co., Milwaukee, wants miscellaneous equipment, including a number of hydraulic presses. The Chicago, Rock Island & Pacific, which bought much equipment some time ago, is still considering the purchase of a punch and shear, 36-in. planer, two 36-in. engine lathes, 18-in. engine lathe and a 36-in. drill press.

Chicago building statistics for November showed a loss of 78 per cent as compared with the same month of 1919. During the month 260 permits were issued involving a frontage of 9839 ft. and a cost of $3,838,700, as compared with 765 permits for buildings fronting 26,363 ft. and costing $17,577,000, granted in November, 1919.

Hoelscher Brothers, manufacturers of heating and plumbing supplies, 1301 West Division Street, Chicago, have purchased the four-story factory which they have occupied for several years under lease.

The Narowetz Heating & Ventilating Co., 223 West Lake Street, Chicago, has received bids through an architect on a one-story plant, 81 x 132 ft., at 1711-17 Park Avenue, to cost $25,000.

The Norton Door Check Co., 904 West Lake Street, Chicago, manufacturer of automatic devices for closing doors, has awarded contract for a one-story plant, 100 x 270 ft., at 2901-09 North Western Avenue, to cost $75,000.

The North American Car Co., 329 South La Salle Street, Chicago, is having plans drawn by H. G. Tregillus, 904 Kimball Building, for two one-story plants, 110 x 200 and 110 x 324 ft., to be built at 135th Street and California Avenue, Blue Island, Ill. The buildings will be of brick and concrete with light steel trusses.

The Union Bed & Spring Co., Blackhawk and Cherry streets, Chicago, has awarded contract for a two and one-story plant, power house and garage, 124 x 600, 40 x 40, 27 x 46 ft., and 26 x 57 ft., at 4343-45 West Colorado Avenue, to cost $90,000.

The Wise Electro Sherardizing Corporation of Illinois has begun operations in a plant containing 10,000 sq. ft. of floor space at 2326 South Western Avenue, Chicago.

The Rockford Sheet Steel Products Co., Rockford, Ill., has been incorporated with $200,000 capital stock by R. D. Chappell and David Pizer, Rockford, and W. H. Hendrickson, Chicago, and will occupy a plant at the corner of Fourteenth Street and Fifteenth Avenue, Rockford. Window casings, window sashes, door jambs, steel kitchenettes and steel equipment for hotels and hospitals will be manufactured.

The Marion Machine Foundry & Supply Co., Marion, Ind., expects to open a new foundry, 110 x 300 ft., within a few weeks.

The P. & M. Co., 80 East Jackson Boulevard, Chicago, manufacturer rail anchors, electric arresters, and kindred products, has increased its capital from $100,000 to $500,000.

The St. Louis Locomotive & Car Co., 5739 Drexel Boulevard, Chicago, R. W. Crawford, president, has acquired land at East St. Louis, Ill., for the erection of a new locomotive and car manufacturing plant to cost about $1,000,000 with machinery.

The Rockford Milling Machine Co., Rockford, Ill., manufacturer of machine tools, has increased its capital from $900,000 to $1,200,000.

The Mount Vernon Furnace & Mfg. Co., Belleville, Ill., has been incorporated with a capital of $75,000 by Carl Schweinfurth, Arthur St. C. Ward, and C. T. Mullen, 12 High Street, to manufacture heaters, furnaces, etc.

The Resilient Wheel Co., 179 West Washington Street, Chicago, has been organized to manufacture automobile wheels. G. H. Fuller and Donald M. Lockett head of the company. McGovney & Tauchen, address noted, represent the company.

The Auto Radiator Mfg. Co., Chicago, has increased its capital to $40,000.

The North American Car Co., 329 South La Salle Street, Chicago, is completing plans for a new car shop at 135th and California streets, Blue Island, Ill., one-story, 80 x 120 ft., and estimated to cost $40,000. It will be equipped primarily for assembling work.

Philadelphia

PHILADELPHIA, Dec. 6.

Machine tool men say their business is at as low a level as during the depression of 1913 and 1914. However, some railroad prospects before the trade serve to keep alive hope. For instance, the Virginian Railway has been securing estimates of cost on several tools, it being intimated that when its list appears it will be for about $200,000 worth of tools. The Pennsylvania Railroad recently bought a 30-in. lathe for its Harrisburg shop and has been asking for a vertical boring mill and a grinder. Opinions are divided as to whether price reductions would stimulate purchases. One seller believes that no buying would develop were prices slashed to one half. A second hand dealer cut prices on all his tools and accessories from 10 to 15 per cent last week.

The General Electric Co., Schenectady, N. Y., has plans under way for the erection of its proposed new plant on Elmwood Avenue, between Sixty-eighth and Seventieth streets, Philadelphia, to be six stories, reinforced-concrete, 80 x 600 ft., and estimated to cost about $500,000, including machinery. It will be used for the most part for the manufacture of switchboard equipment. Harris & Richards, Drexel Building, Philadelphia, are architects. Local offices of the company are in the Witherspoon Building.

The General Asphalt Co., Land Title Building, Philadelphia, has arranged for a bond issue of $4,000,000, the proceeds to be used for general expansion and working capital, including an amount over insurance to replace the plant of its affiliated interest, the Barber Asphalt Paving Co., Maurer, N. J., recently destroyed by fire with loss estimated in excess of $1,000,000. The new works will include an electric power plant and the installation of considerable hoisting, conveying and handling equipment.

The Standard Crown Co., Lippincott and Mascher streets, Philadelphia, manufacturer of metal bottle seals, etc., has taken title to property in the vicinity of its plant, 195 x 210 ft., for extensions.

Henry Disston & Sons, Inc., Tacony, Philadelphia, manufacturer of saws, files, etc., has called a special meeting of stockholders, Jan. 17, to approve an increase in capital from $3,350,000 to $6,000,000.

The Pennsylvania Wire Glass Co., Pennsylvania Building, Philadelphia, is having plans prepared for the erection of a new plant at Lewistown Pa., with main units 175 x 600 ft.; 50 x 100 ft.; and 50 x 75 ft. The works will be equipped for the manufacture of corrugated wire glass specialties. Frank A. Hays, company address, is architect.

The J. S. Thorn Co., Twentieth Street and Alleghany Avenue, Philadelphia, manufacturer of architectural and sheet metal specialties, has acquired land fronting on the New York Division of the Pennsylvania Railroad, between G and I streets, for about $55,000, to be used for future expansion.

The Stokes & Smith Co., Summerdale Station, Philadelphia, manufacturer of machinery and parts, has awarded a contract to R. C. Ballinger & Co., 218 North Thirteenth Street, for extensions and improvements to cost about $19,000.

Reagan, Reese & Co., Inc., Philadelphia, has been incorporated with a capital of $100,000 by Paul K. Reese and Raymond W. Reagan, Philadelphia, and Edward E. Reese, Swissvale, Pa., to manufacture iron, steel and other metal castings.

Freight handling and conveying machinery will be installed on the new pier to be erected by the city of Philadelphia at the foot of Chestnut Street, Delaware River, plans for which have been prepared. George F. Sproul, director Department of Wharves, Docks & Ferries, is in charge.

Edward Board, Philadelphia, operating machine works at Seventh and Wood streets, Philadelphia, has acquired the three-story building at 1541-51 North Twelfth Street, on property 77 x 96 ft., for about $50,000. It will be utilized for extensions.

Fire, Nov. 30, seriously damaged the two-story foundry at the plant of Samuel J. Creswell, Twenty-third and Cherry streets, Philadelphia. The loss has not been estimated.

The Aror Metal Co., Philadelphia, is being organized by Clarence Sheer, I. M. Lowry and Clarence L. Mitchell, North American Building, to manufacture galvanized iron and tin products, and iron and steel specialties. Application will be made for a State charter on Dec. 20.

The Pennsylvania Sugar Co., 1037 North Delaware Avenue, Philadelphia, has awarded a contract to the O'Meara Construction Co., 329 South Broad Street, for a two-story machine shop, 51 x 72 ft., at Delaware Avenue and Shackamaxon Street, to cost about $27,000.

The Krauss-Sena Co., Inc., Philadelphia, is being organized by Harry Krauss, Charles C. and Alexander C. Sena, to manufacture electric and gas fixtures. Application will be made for a State charter. Levi & Mandel, North American Building, represent the company.

The Burroughs Adding Machine Co., 912 Chestnut Street, Philadelphia, manufacturer of calculating machinery, with plant at Detroit, Mich., has leased property totaling about 5000 sq. ft., at Twelfth and Quarry streets, for branch extensions.

The Camden Shipbuilding Co., Camden, N. J., will build a new power house, 20 x 50 ft., on Fifth Street.

The City Council, Reading Pa., is planning for the installation of an electrically operated purification system at the municipal waterworks, to cost about $600,000, including machinery. Emil L. Neubling is engineer.

The Victory Mfg. Co., Colwyn, Pa., has been incorporated with a capital of $100,000 by Frank K. C. Hughes, E. Emalis Berl, and John D. Banks, to manufacture windshields.

The Star Motor Sales Corporation, Prince Street, Trenton, N. J., has filed plans for an addition, 65 x 70 ft., to be equipped as a machine and repair shop. It will cost about $12,000. Frederick J. Wittenborn is secretary.

The Myers Machine Tool Co., Second and Chestnut streets, Columbia, Pa., has awarded miscellaneous contracts for a two-story addition on North Second Street, 52 x 220 ft., to cost about $45,000.

The American Brass Products Co., Pottstown, Pa., has increased its capital from $150,000 to $250,000.

Pittsburgh

PITTSBURGH, Dec. 6.

Machinery activities still are exceedingly limited in this market and the inclination of buyers to defer purchases until after the first of the year has not decreased. No sizable list of tools has come out in the past week and such business as has been closed consists of individual pieces for quick delivery. The crane market also is lacking in actual transactions, although a number of inquiries are before builders. The International Nickel Co., which is building a new mill for rolling monel metal bars and sheets at Huntington, W. Va., has not yet closed on the several cranes and hammers which it will require. This is the only live crane inquiry, although it is expected that a couple of cranes for the new by-product coke plant of the Cambria Steel Co. Johnstown, Pa., will be let shortly. Other inquiries appear to have been indefinitely deferred and those that have come out lately have been chiefly to test the market.

The Acme Die & Stamping Co., McKees Rocks, Pa., has awarded a contract to Frank Bryan, McKees Rocks, for a new two-story and basement plant on Corliss Street, Sheridan, Pa., 40 x 96 ft.

The Erie Electrical Equipment Co., 620 Elder Street, Johnstown, Pa., is arranging for the erection of a plant for the manufacture of electrical and mechanical equipment. It also will include a foundry for the production of brass, bronze and other metal castings. F. S. Proudfort is chief engineer.

The Pittsburgh Truck Mfg. Co., Neville Street, Pittsburgh, will erect a two-story repair plant, 100 x 100 ft., on Forty-fourth Street, to cost with equipment about $75,000.

The Pittsburgh Terminal Railroad Co., Wabash Building, Pittsburgh, will take bids early in the spring for several one-story mechanical buildings at Coversdale, Pa., including a brick and steel forge shop.

The Central Foundry Co., Mount Union, Pa., will hold in abeyance until after the first of the year the erection of its new one-story buildings, estimated to cost about $100,000. W. S. Burgess is in charge.

The Buckhannon Light & Water Co., Buckhannon, W. Va., is planning for the installation of new engine and boiler equipment at its power plant. The company was recently reorganized. Enoch Bellis is president.

The Tenmile Fuel Co., Clarksburg, W. Va., is planning for the construction of a coal tipple at its properties at Adrian, W. V. A cable system will also be installed.

The Silica Sand Products Co., 409 Fitzsimmons Building, Pittsburgh, has perfected plans for a new stone crushing plant at Sturgesson, W. Va., estimated to cost about $50,000, with machinery. W. G. Crawford is head.

The Monticello Smokeless Coal Co., Monticello, W. Va., will build a new tipple at its coal properties.

The Carlton Mining & Power Co., Kingwood, W. Va., is contemplating the erection of a new power plant.

The National Shale Brick Co., Queen Street, Martinsburg, W. Va., has revised plans under way for its new plant, estimated to cost about $250,000, including machinery. F. Vernon Alers is president.

The Herd-List Coal Co., Connellsville, Pa., recently organized, has acquired property at Holly, W. Va., and plans the immediate erection of a new coal tipple. Washington Herd is president, and William Robinson, Uniontown, Pa., is vice-president.

Fire recently destroyed the pattern shop and general offices of the Wheeling Steel Castings Co., Wheeling, W. Va., with an estimated loss of $40,000.

Buffalo

BUFFALO, Dec. 6.

The Niagara County Irrigation & Water Supply Co., Buffalo, is negotiating with the City Council for the erection of a new hydroelectric power plant in the vicinity of Niagara Falls, to cost in excess of $10,000,000. E. C. Randall is president of the company; Commissioner Graves is handling the project for the city.

The Niagara Falls Power Co., Niagara Falls, N. Y., has arranged for a bond issue of $4,000,000, the proceeds to be used in part for extensions and improvements in electric generating plants. With its present plants on the American and Canadian sides of Niagara Falls, the company has a combined capacity of 486,000-hp. Plans are under way to increase this to 620,000-hp. Paul A. Schoellkopf is president and general manager.

The Thomas Flexible Coupling Co., Dunkirk, N. Y., has awarded a contract to the Masters Building Co., Erie, Pa., for a one-story addition, 40 x 200 ft., to cost about $50,000. Headquarters of the company are at Warren, Pa.

The Robeson Cutlery Co., Anderson Avenue, Rochester, N. Y., with plants at Perry and Mount Morris, N. Y., has increased its capital from $600,000 to $1,400,000.

Joseph and John Pietrzak, 1518 Broadway, Buffalo, operating an automobile service works, have made application to the City Council for permission to build a one and one-half story addition, 26 x 34 ft., for electrical construction and repair work, including starters, magnetos, batteries, etc.

The Eastman Kodak Co., Kodak Park, Rochester, N. Y., has awarded a contract to the Fred T. Ley Co., Springfield, Mass., for a two-story addition, 25 x 138 ft., to cost about $60,000.

The Pomeroy & Stellrecht Co., 582 Kensington Avenue, Buffalo, manufacturer of machinery, has filed notice of change of name to the Stellrecht Machine Co.

Howard M. Keller, Buffalo, operating an automobile service and repair works at 745 Jefferson Street, has made application to the City Council to build an addition 28 x 55 ft., to be equipped entirely for machine and general repair operations.

The ReQua Electrical Supply Co., Inc., 95 St. Paul Street, Rochester, manufacturer of electrical specialties, has increased its capital from $50,000 to $100,000.

The Iroquois Utilities, Inc., City Bank Building, Syracuse, N. Y., has completed plans for a new electric generating plant at Gowanda, N. Y. B. H. Shepard is president. Charles B. Eaton, Sheridan Block, Watertown, N. Y., is engineer.

The Ogden R. Adams Co., Rochester, N. Y., has been incorporated with a capital of $125,000 by Ogden R. Adams, C. E. Kinney and I. E. Mason, to manufacture mechanical and electrical machinery.

The Rochester Stamping Co., Anderson Avenue, Rochester, manufacturer of copper, brass and other metal products, has increased its capital from $900,000 to $2,800,000.

The Batavia Car Works, Inc., Batavia, N. Y., has taken bids for its new plant fronting on the Erie Railroad. Contract for the main factory, one-story, 120 x 400 ft., will be let at an early date. The plant with machinery is estimated to cost about $200,000. The company was recently organized with a capital of $350,000. John Bauket is head.

Detroit

DETROIT, Dec. 6.

The machine tool market in this district is at a standstill. The present feeling seems to be that while automotive industrial conditions are showing a little improvement there will be little change in market conditions until spring.

The force at the Chevrolet Motor Car Co.'s plant at Flint, Mich., is being increased and according to C. F. Barth, general manager, it is expected that Plant 490 will be operated on a 40 per cent basis, which would entail a production of about 70 cars a day until the first of the year. The Tarrytown, N. Y., plant of the company has been reopened after a shutdown of nearly two months. Normally, about 2000 are employed in this plant and about 300 cars a day are produced. The new schedule calls for 100 cars a day.

The Zenith Foundry Co., Detroit, has taken bids for its new one-story foundry on Miller Avenue, 90 x 200 ft., to cost in excess of $45,000. G. W. Graves, Detroit, is architect.

The Advance-Rumely Co., manufacturer of farm implements, with plants in Indiana and Battle Creek, Mich., has gone into the manufacture of a 1½-ton truck, designed especially for farm work.

The $275,000 increased capital stock of the Howell Electric Motors Co., Howell, Mich., has been oversubscribed. The company expects to double its production within the next few months.

The Wilson Foundry & Machine Co., Pontiac, Mich., has increased its capitalization from $5,000,000 to $6,300,000.

Directors of the Jacquet Motor Corporation of America, Belding, Mich., have authorized an increase in the capital stock from $100,000 to $250,000.

The Atlas Iron Works, Detroit, has been taken over by the Atlas Iron & Steel Co. and the capital stock increased from $100,000 to $200,000. The company will go into the ornamental iron business. John W. Bass is president of the new organization, the other officers remaining unchanged.

The Page Steel & Wire Co., Adrian, Mich., has taken out a permit for a one-story addition, 50 x 286 ft., to cost $60,000.

The Steel Age Mfg. & Supply Co., Battle Creek, Mich., manufacturer of mill equipment and supplies, has increased its capital to $150,000.

The Auto Wheel Service Co., Detroit, has been organized to manufacture automobile wheels and operate a general machine works for repairing such equipment. John W Brown and Samuel S. Smith, 629 Seneca Avenue, head the company.

The Lincoln Motor Co., Holden Street, Detroit, manufacturer of aeroplane motors, etc., denies the report that its plant has been closed. Operations in a few departments were curtailed temporarily and work will be resumed at an early date. The automobile department is said to have orders on hand in excess of production.

The Dearborn Equipment Co., Kalamazoo, Mich., has increased its capital from $100,000 to $200,000.

The Atlas Drop Forge Co., Lansing, Mich., has preliminary plans under way for a new one-story and basement forge shop, 65 x 500 ft., and power house, to cost about $200,000 and will begin construction next spring. Richard H. Scott is president.

Milwaukee

MILWAUKEE, Dec. 6.

The machine tool market is dull. Production is at low ebb, most shops having cleaned up old business and but few are inclined to build machines for stock. Some scattering inquiry is developing, however, and the local trade expects to see at least a small amount of business placed during the month. In general, it is believed that trade will not resume activity until after the inventory period. Inquiries indicate a resumption of buying at that time.

The Milwaukee Reliance Boiler Works, 1102 Thirty-second Street, Milwaukee, is awarding contracts for a two-story brick and mill shop, ell-shaped, 100 x 125 ft., to cost about $50,000. It will be equipped principally for assembling purposes. The company has erected a number of additions this year and with the present project the improvements will involve an investment of about $150,000. John E. Sharp is president and general manager.

The Madison Tool & Stamping Co., Madison, Wis., which recently increased its capitalization from $10,000 to $25,000, has reorganized as follows: President, H. A. Hass; vice-president, William Gregorson; secretary, C. E. McCampbell; treasurer and general manager, Lorenz Maisel. Next spring the company intends to build a plant of its own, but details of building and equipment are not yet ready.

The Meehan Mfg. Co., Milwaukee, manufacturer of non-explosive acetylene generating and illuminating systems, has purchased a site at Jackson, Wis., and will break ground Jan. 1 for a plant, 80 x 100 ft. The general contract has been let to the Keystone Structural Steel Co., Majestic Building, Milwaukee.

The Board of Education, DePere, Wis., has engaged Foeller & Schober, architects, Green Bay, Wis., to design a new high school to cost approximately $150,000 to include manual training shops. Work will begin early in the spring.

The Giant Grip Co., Oshkosh, Wis., formerly the Challoner Co., has let the general contract to Fluor Brothers, local contractors, for a one-story forge shop addition, 51 x 57 ft., estimated to cost $40,000 with equipment. It manufactures anti-skid devices for motor truck wheels, portable sawmill units, light metal cutting machines, etc.

The Line Materials Co., South Milwaukee, Wis., manufacturer of electric transmission supplies and materials, sustained an estimated loss of $40,000 by fire in its assembling shop and office building on Nov. 29. Operations have not been greatly curtailed, as two new concrete shop buildings were erected recently to house the manufacturing departments. W. D. Kyle is general manager.

The Mauston, Wis., Commercial Club is organizing a corporation to be capitalized at $75,000 to manufacture patented milking machines and other dairy appliances. J. E. Buck and Louis Hasse Mauston are interested.

The Stoughton, Wis., works of the Moline Plow Co., resumed operations with a 50 per cent force Dec. 1 after a recess of several weeks for readjustment. George F. Ford is general manager at Stoughton.

The Board of Education, Fond du Lac, Wis., has accepted plans prepared by Childs & Smith, architects, 64 East Van Buren Street, Chicago, for a two-story high school, 268 x 334 ft., including a vocational training department. Bids for construction will be taken after Dec. 15. W. S. O'Connor is president of the board.

The Universal Appliance Co., Milwaukee, has been incorporated with a capital stock of $10,000 to manufacture automotive parts and materials. The incorporators are Paul Mueller, Winton D. Lansing and A. A. Kern, 625 Cedar Street.

The Devices Industry, Inc., Oshkosh, Wis., has transferred its operation to its new plant at 116 Ohio Street and resumed the production of automatic devices for serving air to motorists by garages, etc. A general line of compressors for automotive use will be added. Samuel F. Loper is president and Walter S. Williams, secretary and treasurer.

The Rhinelander Paper Co., Rhinelander, Wis., has increased its capital stock from $1,700,000 to $3,500,000 and will devote the major part of the new issue to the enlargement of its mills and equipment during the coming year.

The Turner Mfg. Co., Port Washington, Wis., manufacturer of gas engines, tractors, etc., will begin work March 1 on the construction of a new gray iron foundry, 80 x 120 ft., to cost about $50,000. This is part of an extension program calling for foundry and machine shop enlargement projected early in the summer but held in abeyance. Frank D. Chase, Inc., is general contractor and engineer.

The Columbia County Board of Supervisors, Portage, Wis., has appropriated $5,000 for the purchase of equipment for a shop to be erected at Wyocena as a service station for highway machinery and equipment.

The Board of Education, Spooner, Wis., has ordered revised plans from W. L. Alban, architect, 347 Endicott Building, St. Paul, Minn., for the proposed new junior high and vocational training school, to keep the cost within $75,000. W. C. Crocker is secretary of the board.

The Stinson Tractor Co., Minneapolis, is marketing a new issue of capital stock amounting to $275,000 to finance enlargement of its main works at Superior, Wis. Plans are in preparation and work will begin about April 1.

The Gulf States

BIRMINGHAM, Dec. 6.

The Southern Dry Dock & Shipbuilding Co., Orange, Tex., has plans under way for a new plant for fabricated steel work. A department will be provided for steel and wooden car construction. The company recently increased its capital from $100,000 to $200,000.

The Dalhart Hardware Co., Dalhart, Tex., has been incorporated with a capital of $75,000 by J. N. Riggs, H. B. and J. T. Thompson, to manufacture hardware and metal specialties.

The Gulf, Colorado & Santa Fe Railway, Galveston, Tex., is planning for the erection of additions to its repair shops and engine house at Amarillo, Tex., to cost about $125,000.

The Noles Water Filter Co., Jacksonville, Fla., has been incorporated with a capital of $50,000 by J. H. Braden, T. R. Miller and G. V. Buffington, to manufacture water filters and filtering equipment.

Fire, Nov. 20, destroyed the cotton ginning plant of the Portis Mercantile Co., Lepanto, Ark., with loss estimated at about $45,000.

The H. & R. Co., Meridan, Miss., has been incorporated with a capital of $50,000 by Benjamin and Samuel Holz and J. A. McCain, to manufacture babbitt metal and other metal products.

The Southern Metal Co., Lake Charles, La., recently organized, has plans under way for a new building, 40 x 65 ft., to manufacture steel oil drums, galvanized cans and other metal containers. Henry Reid and Paul D. Perkins head the company.

The City Planing Mill Co., Breckenridge, Tex., recently organized, has plans under way for a new plant to manufacture bodies for cars and trucks. A wheel department will also be included. A. Earle Butler is president and manager.

The Southern Radiator Co., Waco, Tex., has been incorporated with a capital of $20,000 by F. L. Lightfoot and John McGlasson, to manufacture radiators and other metal products.

The capital stock of the Skinner Machinery Co., Clearwater, Fla., has been increased to $600,000.

Cleveland

CLEVELAND, Dec. 6.

Few new inquiries came out the past week and a very limited amount of business was placed, mostly in single machines. The only pending inquiry of size that is expected to result in orders this year is that of the Ohio Locomotive Crane Co., Bucyrus, which recently issued a list of 53 machines for its affiliated interest, the Toledo Crane Co., which will manufacture electric traveling cranes. It has bought a few lathes, and several vertical boring machines, radial drills, gear cutters and large planers are included in its list. Some fairly good inquiries are pending which are expected to develop into orders after the first of the year.

The Demco Machine Tool Co., Cleveland, has reduced quotations approximately 5 per cent on its single and multiple spindle sensitive drills, but no other price changes are noted. There is apparently more of a tendency among machine tool manufacturers to guarantee prices against a decline until April 1.

The Toledo Crane Co., Bucyrus, Ohio, has been incorporated with a capital stock of $500,000 to succeed the Toledo Bridge & Crane Co., Toledo, Ohio. It was announced recently that Charles F. Michael of the Ohio Locomotive Crane Co. and the Carroll Foundry & Machine Tool Co., Bucyrus, had purchased the crane business of the Toledo Bridge & Crane Co. and the new company has been organized as a result. W. F. Billingsley, who has been active in the management of the crane department of the Toledo Bridge & Crane Co., will be associated with the new company. Contract has been placed for the plant, which will include a machine shop, 60 x 300 ft.; structural shop, 90 x 300 ft.; assembly shop, 120 x 320 ft.; pattern shop and storage building, 75 x 200 ft., and a forge shop, 40 x 100 ft.

The Bessinger Piston Ring Co., Wellington, Ohio, will locate in Cleveland, having leased a part of a factory building at 707 Canal Road.

The Trumbull Cliffs Furnace Co., Warren, Ohio, will equip a machine shop for repair work in connection with the new blast furnace it is building, and is expected to issue a machinery list shortly.

The Norwalk Machine & Tool Co., Norwalk, Ohio, has established a plant for the manufacture of high speed and carbon steel milling cutters. It will confine its product for the present to end mills. A. R. Marsh, formerly associated with the Marsh Motors Co., Cleveland, is at the head of the company.

A general machine and repair shop will be opened in Vermilion, Ohio, by George Harrs and Charles Stumpp.

It is reported that the Baltimore & Ohio Railroad will enlarge its shops at Zanesville, Ohio, and install new machinery to take care of repairs on box and refrigerator cars.

Cincinnati

CINCINNATI, Dec. 6.

The machinery market is extremely dull. While a few orders are being booked, they are chiefly for single machines and quick delivery is specified. Most manufacturers have caught up with deliveries and will make some machines for stock. Further curtailment of operations was noted the past week, several plants laying off about 25 per cent of their force, and in others the hours of work were curtailed, in some cases to 30 hours a week. No large inquiries

have been issued, and buying on several railroad lists has not begun. Dealers report a few sales during the week, and there are indications from other sources that a number of tools will be purchased shortly after the first of the year. Manufacturers are firmly convinced that business will again open up in the spring, and that the railroads in particular will be good customers.

The new plant of the Universal Machine Co., Bowling Green, Ohio, is about completed and it is expected that operations will begin the middle of December. The building is 95 x 220 ft., and in addition to the machine shop, contains a drop forging plant. Another extension to house a number of forging hammers is under construction. It is said that the company has received an order for automobile axles which will keep it operating for five months.

The Ridgely-Murray Co., Springfield, Ohio, has been authorized to increase its capitalization from $30,000 to $50,000 to take care of its growing business. J. W. Black is president.

The Atlas Brass Foundry Co., Columbus, Ohio, has recently installed an electric furnace in its plant. The company now has a capacity of eight tons per day in its foundry department.

Harry J. Oakes has been appointed receiver for the Dayton Metal Body Co., Dayton, Ohio, and has been authorized to continue the business. It manufactures metal bodies for Ford cars and is said to have enough orders booked which when completed will enable it to lift the receivership, and for which Mr. Dutch became surety.

The W. E. Lamneck Co., West Fifth Avenue, Columbus, Ohio, manufacturer of ventilating and heating equipment, will defer the erection of its proposed one-story plant, 120 x 200 ft., until after the first of the year. It is estimated to cost about $50,000. A. P. Lamneck is secretary and treasurer.

The Standard Pulley Co., 1738 Powers Street, Cincinnati, has tentative plans under way for a new one-story foundry. It is likely that construction will be deferred until spring. F. Jewett, Jr., is president.

Baltimore

BALTIMORE, Dec. 6.

The William E. Hooper Sons Co., 3502 Parkdale Avenue, Baltimore, has had plans prepared for a two-story machine shop, 28 x 34 ft., at its cotton mills to cost about $25,000. R. P. Hooper is president.

The Gibson & Kirk Co., 211 Key Highway, Baltimore, manufacturer of brass, bronze and other metal products, has filed plans for a one-story addition, to be used as a foundry. It recently took over the plant of the Thomas Engineering Co., 215 Key Highway, and has general expansion plans under way. T. W. Thomas is president.

The McNamara Brothers Co., Inc., Kloman Street, Baltimore, manufacturer of boilers, tanks, etc., will hold in abeyance for about 60 days the erection of its one-story addition, 80 x 200 ft., estimated to cost $25,000.

The Duraflex Co., Continental Building, Baltimore, has prepared a list of equipment to be installed in its new plant on the Hollins Ferry Road, recently acquired, for the manufacture of flooring specialties, to include grinding and mixing machinery, agitators, dryers, etc. Ralph Bolgiano is president and treasurer.

The Spann Motor Co., 3125 Philadelphia Avenue, Baltimore, has had plans revised for its new two-story service building, including machine shop and repair works, at Elwood and Philadelphia avenues, and new bids on separate contracts will be taken at an early date. It will be 150 x 167 ft., and is estimated to cost $125,000. The company was recently incorporated with a capital of $225,000. Charles A. Spann is head.

The Lalor Fuel Oil System Co., 523 Calvin Street, Baltimore, has been incorporated with a capital of $100,000 by C. Bradley Hays, James D. and William B. Lalor, to manufacture fuel oil apparatus and devices.

The Potomac Electric Power Co., 231 Fourteenth Street, N. W., Washington, has preliminary plans under way for a new electric generating plant, to cost in excess of $2,000,000. It is proposed to begin construction during the coming year and have it ready for service early in 1922.

The Greenville Storage Battery Co., Greenville, N. C., has been incorporated with a capital of $50,000 by W. T. Bryan, W. G. Downing and J. K. Proctor, to manufacture storage batteries and other electrical equipment.

The Norfolk Veneer Co., Twenty-third and Armstead streets, Norfolk, Va., has filed plans for rebuilding the portion of its plant recently destroyed by fire. It will be one-story, 80 x 230 ft., and cost about $50,000.

The Kennedy Coal Co., Swords Creek, Va., is planning to rebuild its machine shops, recently destroyed by fire.

Following the completion of its first plant unit, now in course of erection, the Kleiber Motor Truck Co., Park and Peters streets, Atlanta, Ga., is planning for the erection of a second building with increased area. Edward Kleiber is president.

The Richardson Automobile Electric Corporation, 7 West Chase Street, Baltimore, recently organized, is planning for the installation of machinery to manufacture electrical equipment for automobile service. Donald R. Richardson is president and manager.

The Champion Fiber Co., Canton, N. C., is perfecting plans for two additions to its plant, 140 x 410 ft., and 95 x 400 ft. respectively, to cost about $1,400,000, including equipment.

The electrical department at the car repair shops of the Atlantic Coast Line, Wilmington, N. C., was destroyed by fire, Nov. 27, with loss estimated at about $25,000.

Fire, Nov. 29, destroyed the machine shop at the plant of the Towers & Sullivan Mfg. Co., Rome, Ga., manufacturer of agricultural implements, with loss estimated at about $60,000.

The United Mills Co., Hickory, N. C., is planning to erect a new hydroelectric power plant in the vicinity of Mortimer, N. C., for cotton mill operation and for general light and power service in that section.

Fire, Nov. 26, destroyed a section of the plant of the Farmers' Oil Mill Co., Nashville, N. C., with loss estimated at about $75,000, including equipment.

The Lockhart Power Co., Lockhart, S. C., has completed plans for the erection of a new hydroelectric power plant on the Broad River, with initial capacity of about 15,000 hp. Emslie Nicholson is president.

The Western Maryland Railway, Baltimore, has awarded contract to Vaile & Young, Baltimore, for a one-story repair shop at Marshall and McComas streets.

The National Oil Co., Baltimore, has purchased property 35 x 201 ft., on which, it is understood, an addition will be erected.

The Central South

ST. LOUIS, Dec. 6.

The Capital Lampagraph Co., St. Louis, manufacturer of electric lighting equipment, electrically operated talking machines, etc., is contemplating the establishment of a new plant at Indiana Harbor, Ind. The main offices of the company will be removed to Chicago.

The B. B. Mfg. & Drilling Co., St. Louis, manufacturer of machinery, has filed notice of change of name to the Drilling & Equipment Co., at the same time increasing its capital from $500,000 to $5,500,000.

Fire, Nov. 26, destroyed a portion of the plant of the Hart Mfg. Co., Hart and Twentieth streets, Louisville, manufacturer of furnaces, etc., with loss estimated at about $35,000.

Plans are being prepared by the following coal companies in Kentucky for the erection of tipples at their properties: Minelga-Harlan Coal Co., Harlan; Yellow Creek Coal Co., Stacy; Four Seams Collieries Co., Collins; Adamson Coal Co., Shelby Gap, near Dorton, and the Mossy Bottom Coal Co., Pikeville.

The Western Kentucky Pipe Line Producing & Refining Co., Bowling Green, Ky., has plans under way for the construction of a new refinery. Thomas M. Coyle is general manager.

Fire, No. 26, destroyed a portion of Plant D of the Soaper Planing Mills & Lumber Co., Richmond, Ky., with loss estimated in excess of $100,000, including machinery.

The Louisville Electric Mfg. Co., 660 South Second Street, Louisville, has awarded a contract to A. Markham & Co., Louisville, for a new one-story plant, 60 x 150 ft., for the manufacture of portable electric tools.

The Marland Tank Line Co., affiliated with the Marland Refining Co., Ponca City, Okla., has arranged for a bond issue of $1,296,000 for equipment purchases and general expansion. W. G. Lackey is vice-president of the refining company, which operates plants at Ponca City and Covington, Okla.

The J. W. Murray Mfg. Co., Detroit, manufacturer of automobile accessories, has acquired the plant of the St. Louis Paper Can & Tube Co., 4400 Union Avenue, Maplewood, near St. Louis, for the establishment of new works. It will be equipped for the manufacture of automobile parts, fenders, tanks and similar specialties. James R. Murray is president.

Earl J. Dove, Oklahoma City, Okla., and associates are organizing a company to build an oil refinery in the vicinity of Paducah, Ky., estimated to cost about $500,000 with equipment.

The J. B. Elkhorn Coal Co., Virgie, Ky., is considering plans for a new electric power plant.

The White Co., Cleveland, manufacturer of automobiles, has plans under way for a new three-story, reinforced-concrete service building, 120 x 145 ft., at Twenty-eighth and Warwick streets, Kansas City, Mo., to cost about $250,000. The Watson Engineering Co., Hippodrome Building, Cleveland, is architect and engineer.

The Fee-Clayton Hardwood Lumber Co., Dermott, Ark., is planning to rebuild the section of its plant recently destroyed by fire with loss estimated at $150,000, including machinery.

The Columbia Compress Co., Magnolia, Ark., has plans under way for rebuilding its cotton compress, recently destroyed by fire with loss estimated at $250,000, including equipment.

Indiana

INDIANAPOLIS, Dec. 6.

The Monon Railroad, 608 South Dearborn Street, Chicago, has completed plans for new car and locomotive repair shops at Lafayette, Ind., and will award contract at an early date.

The Van Briggle Motor Device Co., 429 Capitol Avenue, Indianapolis, will defer until next spring the erection of its proposed plant, two-stories, 32 x 65 ft., at Mooresville, Ind.

The City Council, Linton, Ind., is having plans prepared for a one-story electric light and power plant, 75 x 100 ft., to cost about $100,000. Shrouds, Stoner & Co., Tribune Building, Terre Haute, Ind., are engineers.

The Mutual Truck Co., Sullivan, Ind., manufacturer of automobile trucks, will hold in abeyance, probably until next spring, the erection of a two-story addition, 80 x 100 ft., estimated to cost about $75,000. The construction contract recently was let to the N. J. Hoffman Construction Co., Evansville, Ind.

The Indestructible Wheel Co., Lebanon, Ind., manufacturer of steel wheels for automobile service, has prepared a list of machine tools and equipment to be installed in its proposed new one-story plant, 80 x 120 ft., to cost about $50,000. A. M. Lofland is secretary and treasurer.

The Bastian Morley Co., Laporte, Ind., manufacturer of boilers, has increased its capital stock from $350,000 to $450,000.

The Blount Plow Works, Evansville, Ind., has issued $500,000 worth of preferred stock.

The first unit, 80 x 100 ft., of the Bedford Tractor Co., Bedford, Ind., has been completed. The company plans to build 10 similar units for the manufacture of farm tractors.

Fred W. Goedeke, manufacturer of stamped steel hardware and stamped metal specialties, Evansville, Ind., has moved into his new one-story factory, 70 x 109 ft., at the corner of Goodsell and Ohio streets.

The Pacific Northwest

SEATTLE, Nov. 30.

The industrial situation remains quiet, but there is a general feeling that improvement will be noted shortly after the first of the year. Many plants are closed until after Jan. 1 and others are operating with curtailed production. Several instances of a cut in wages has been recorded.

The Brinkley Supply Co., 651 Alaska Street, Seattle, manufacturer of small logging equipment, will erect a one and one-half frame factory, 70 x 100 ft., at a cost of $10,000. New equipment will be installed.

The Vulcan Iron Works, Vancouver, B. C., has received contract for four 1150-hp. Scotch marine boilers for the Canadian Pacific Railway's coast passenger steamer under construction.

The Krause Engine & Mfg. Co., Spokane, has been incorporated for $60,000 and plans the establishment of a factory for manufacturing and repairing machinery. Albert F. Krause is president.

The Stradivara Phonograph Co., Portland, is preparing plans for doubling the capacity of its works. It has a capital stock of $5,000,000 and is headed by J. T. Thompson, who is general manager.

The Clackamas Power & Irrigation Co., Portland, will develop power on the Clackamas River and construct a hydrogenerating plant at a cost of $1,250,000.

The Tubular Steel Automobile Wheel Mfg. Co., Spokane, has been incorporated for $200,000 to manufacture automobile accessories.

California

SAN FRANCISCO, Nov. 30.

The Shartzer Illuminated License Plate Co., Oakland, Cal., is taking bids for the erection of its new plant on the Oakland waterfront, consisting of three one-story buildings, with main unit, 50 x 200 ft., other structures, 40 x 120 ft. It is estimated to cost about $60,000. Edward Demar, 5760 Shafter Avenue, Oakland, is architect.

The George W. Eno Rubber Co., Los Angeles, has increased its capital from $100,000 to $250,000.

The Navy Department, Washington, is planning for the establishment of a new optical instrument plant at the Mare Island Navy Yard, near San Francisco. Lieutenant Charles Swanberg will be in charge.

The Pressed Steel Products Co., Los Angeles, manufacturer of automobile wheels, has filed notice of change of name to the Dicodisk Steel Wheel Corporation.

The Scripps-Booth Corporation, Detroit, a division of the General Motors Corporation, has approved plans for the erection of its new plant at Oakland, Cal., on a site recently acquired. It is proposed to break ground for the initial plant units early in the spring, in the meantime perfecting arrangements for machinery. The plant will be used primarily for assembling work, and is estimated to cost close to $1,000,000 with equipment.

Fire, Nov. 30, destroyed a portion of the oil refinery of the Union Oil Co., Avila, near San Luis Obispo, Cal., with loss, including machinery, estimated at $300,000. Headquarters of the company are at 215 West Seventh Street, Los Angeles.

The Forderer Cornice Works, 269 Potrero Avenue, San Francisco, manufacturer of metal architectural specialties, has filed plans for a one-story shop addition.

B. H. Cass, 322 South Spring Street, Los Angeles, has filed plans for a one-story foundry at 2501 Edwin Street.

T. A. Huffaker & Son, 250 Sherman Way, San Fernando Annex, Los Angeles, have completed plans for a new one-story machine shop.

The Triple Driver Tractor & Plow Co., Riverside, Cal., has been incorporated with a capital stock of $5,000. C. W. Kirby, N. B. Last and R. H. Bumpreys are directors.

Canada

TORONTO, Dec. 6.

The demand for machine tools in this market continues quiet with sales chiefly confined to single tools and equipment urgently needed. A number of inquiries are in the market for some good sized lists but so far practically none has been closed.

Bids will be received by Ernest F. Webb, city clerk, Prince Albert, Sask., until Dec. 18 for the following equipment:

One horizontal centrifugal pump, capacity 1400 Imperial gal. per min., 50 ft. head, direct connected to alternating current motor.
One pump as above without motor.
One horizontal centrifugal pump, capacity and head as above, direct connected to steam turbine.
One horizontal centrifugal pump, capacity 1400 Imperial gal. per min., 190 ft. head, direct connected to alternating current electric motor.
One pump as above except capacity 700 Imperial gal.
One horizontal centrifugal pump, capacity 1400 Imperial gal., 190 ft. head, direct connected to steam turbine.
Two vertical centrifugal pumps, capacity 500 U. S. gal. per min., 40 ft. head, direct connected to alternating current motor.

The Three Rivers Pulp & Paper Co., Ltd., has awarded the general contract to William I. Bishop, Ltd., Montreal, for the construction of its plant at Three Rivers, Que., to cost with equipment $1,500,000.

New tenders will be called in the spring for an addition to the foundry of the Corbet Foundry & Machine Co., 1064 First Avenue West, Owen Sound, Ont., to cost $25,000. W. Forrester & Clark, 1076 First Avenue West, are architects.

The Progress Spring Bed Co., Ltd., 148 Cadieux Street, Montreal, has awarded contracts for an addition to its factory to cost $10,000.

The Canadian Tygrad Engine Co., Toronto, has awarded contract for its carburetor plant to be erected on Kingston Road at a cost of $40,000, to the Trussed Concrete Steel Co., 34 King Street West, Toronto.

G. Dupont, Montreal, has awarded contracts for the erection of a brass foundry and workshops on Aird Avenue.

The Tuttle-Bailey Mfg. Co., manufacturer of registers and grills, is preparing plans for an addition to its Bridgeburg, Ont., plant. Peter Gordon is general manager.

R. Smith, chairman of the Commission, Leamington, Ont., is interested in prices and data regarding smoke consumers for installation in the waterworks pumping station.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes*

Bars:	Per Lb.
Refined iron, base price	4.70c.
Swedish bars, base price	20.00c.
Soft steel bars, base price	3.48c. to 3.70c.
Hoops, base price	4.18c. to 6.00c.
Bands, base price	4.18c. to 4.65c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.58c. to 3.80c.
Channels, angles and tees under 3 in. x ¼ in., base	3.48c. to 3.70c.

*The low prices are those of the Carnegie Steel Co. and are subject to a cartage charge of 15c. per 100 lb. in the Metropolitan district and 10c. per 100 lb. to local points in New Jersey.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	4.15c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.65c.
Toe calk, ½ x ⅜ in. and larger	5.00c.
Cold-rolled strip (soft and quarter hard)	10.35c. to 11c.
Open-hearth spring steel	6.50c. to 10.00c.
Shafting and Screw Stock:	
Rounds	6.25c.
Squares, flats and hex	6.75c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c. to 24.00c.
Extra best cast steel	25.00c. to 30.00c.

Tank Plates—Steel

¼ in. and heavier	3.78c. to 4.00c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.68c. to 5.50c.
No. 12	4.73c. to 5.55c.
No. 14	5.60c.
No. 16	5.70c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Wood's Refined, Per Lb.
Nos. 18 to 20	6.30c. to 7.90c.	.....
Nos. 22 and 24	6.35c. to 7.95c.	9 80c.
No. 26	6.40c. to 8.00c.	9 85c.
No. 28	6.50c. to 8.10c.	10 00c.
No. 30	6.75c. to 8.35c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	7.00c. to 8.60c.
No. 16	7.25c. to 8.75c.
Nos. 18 and 20	7.40c. to 8.90c.
Nos. 22 and 24	7.55c. to 9.05c.
No. 26	7.70c. to 9.20c.
No. 27	7.85c. to 9.35c.
No. 28	8.00c. to 9.50c.
No. 30	8.50c. to 10.00c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—34	—17	¾-1½ in. Butt.	— 3	+17
¾-3 in. Butt.	—38	—22	2 in. Lap.....	+ 3	+21
3½-6 in. Lap.	—33	—18	2½-6 in. Lap...	+ 1	+17
7-12 in. Lap..	—23	— 6	7-12 in. Lap....	+12	+30

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	8.00c.
Annealed soft	8.00c.
Galvanized annealed	8.75c.
Coppered basic	8.50c.
Tinned soft Bessemer	10.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	23½c. to 24c.
High brass wire	24¼c. to 25c.
Brass rod	21¼c. to 24c.
Brass tube	39¼c. to 41c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 24½c. to 27c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20
IC	$12.65	$11.65
IX	14.45	13.45
IXX	16.25	15.05
IXXX	17.85	16.65
IXXXX	19.45	18.25

Coke—14x20	Primes	Wasters
80 lb.	$9.80	$9.55
90 lb.	9.90	9.65
100 lb.	10.00	9.75
IC	10.25	10.00
IX	11.25	11.00
IXX	12.25	12.00
IXXX	13.25	13.00
IXXXX	14.25	14.00

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.85
IC	9.00
IX	10.00
Fire door stock	12.00

Tin

Straits pig	39c.
Bar	44c. to 49c.

Copper

Lake ingot	16½c.
Electrolytic	16½c.
Casting	16½c.

Spelter and Sheet Zinc

Western spelter	8¾c. to 9c.
Sheet zinc, No. 9 base, casks	14c. open 14½c.

Lead and Solder*

American pig lead	7¾c. to 8½c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	26½c.
Refined solder	22½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.

Antimony

Asiatic	7½c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....35c. to 38c.

Old Metals

There was a declining tendency during the early part of the week, but this was halted by the better aspect of the new market toward the end of the week. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.25
Copper, heavy and wire	10.25
Copper, light and bottoms	8.50
Brass, heavy	6.75
Brass, light	4.75
Heavy machine composition	10.50
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	8.50
Lead, heavy	3.50
Lead, tea	3.00
Zinc	3.50